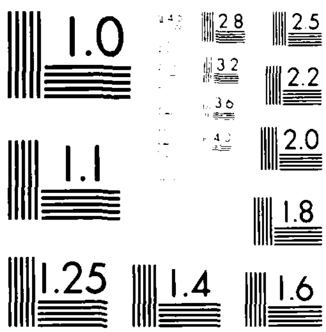
AD-A186 322 ARMY TRAINING STUDY: TRAINING EFFECTIVENESS ANALYSIS 1/4
(TEA) SUMMARY(U) ARMY TRAINING AND DOCTRINE COMMAND
FORT MONROE VA F J BROWN ET AL 08 AUG 78
UNCLASSIFIED SBI-AD-F000 106 F/G 15/1 NL


1.0
2.8
2.5
3.2
2.2
3.6
4.0
2.0
1.1
1.8
1.25
1.4
1.6

[redacted]

DTIC FILE COPY

ARMY TRAINING STUDY

The contents of this draft report are those of the study group and should not be construed as an official Dept of Army position unless so designated by other official documentation.

AD-A186 322

ARMY TRAINING STUDY

1977-1978

TRAINING EFFECTIVENESS ANALYSIS (TEA) SUMMARY

~~FOR OFFICIAL USE ONLY~~

87 8 21 063

SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188 Exp. Date Jun 30, 1986

1a. REPORT SECURITY CLASSIFICATION: Unclassified	1b. RESTRICTIVE MARKINGS: None
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION/AVAILABILITY OF REPORT: Approved for Public Release; Distribution is unlimited.
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S)	5. MONITORING ORGANIZATION REPORT NUMBER(S)
6a. NAME OF PERFORMING ORGANIZATION: U.S. Army Training Study Study Group; 6b. OFFICE SYMBOL (If applicable)	7a. NAME OF MONITORING ORGANIZATION: U.S. Army Training and Doctrine Command Deputy Chief of Staff for Training
6c. ADDRESS (City, State, and ZIP Code): Fort Monroe, VA 23651-5000	7b. ADDRESS (City, State, and ZIP Code): Fort Monroe, VA 23651-5000
8a. NAME OF FUNDING/SPONSORING ORGANIZATION; 8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c. ADDRESS (City, State, and ZIP Code)	10. SOURCE OF FUNDING NUMBERS: PROGRAM ELEMENT NO / PROJECT NO / TASK NO / WORK UNIT ACCESSION NO

11. TITLE (Include Security Classification)
The Army Training Study. Training Effectiveness Analysis (TEA) Summary and ~~TEA '78 Test Reports.~~

12. PERSONAL AUTHOR(S)
Brigadier General Frederic J. Brown III, et al

13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (Year, Month, Day)	15. PAGE COUNT
Final report	FROM ____ TO ____	1978, August 8	379

16. SUPPLEMENTARY NOTATION

17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB-GROUP	Army Training System, Battalion Training Model (BTM), Training Effectiveness Analysis (TEA).

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

The Army Training Study (ARTS Study) conducted a comprehensive overview of Army training. The research probed across a wide range of training issues as the study group sought a broad perspective of army training. The study group conducted a field surveys at numerous continental US Army posts and schools. The data obtained was analyzed using the Training Effectiveness Analysis (TEA).

The Training Effectiveness Analysis (TEA) summary volumes explain the analysis of the data gathered on both institutional training and unit training across a range of combat, combat support and combat service support systems and skills, supplemented by research into such completed tests as CAMMS, REALTRAIN and Chaparral. It provided some of the data necessary for the formulation of the Battalion Training Model and provided insight into the general state of training in the army.

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT: [X] UNCLASSIFIED/UNLIMITED [ ] SAME AS RPT. [ ] DTIC USERS	21. ABSTRACT SECURITY CLASSIFICATION: Unclassified
22a. NAME OF RESPONSIBLE INDIVIDUAL: Tho. McCool	22b. TELEPHONE (Include Area Code): 727-4337; 22c. OFFICE SYMBOL: ATTG-B

DD FORM 1473, 84 MAR — 83 APR edition may be used until exhausted. All other editions are obsolete. — SECURITY CLASSIFICATION OF THIS PAGE

[redacted]

Accession For	
NTIS GRA&I	X
DTIC TAB	☐
Unannounced	☐
Justification	
By	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	

TRAINING EFFECTIVENESS ANALYSIS (TEA)

SUMMARY

DTIC COPY INSPECTED

The views, opinions, and/or findings contained herein are those of the Army Training Study Group and should not be construed as an official Department of the Army or US Army Training and Doctrine Command (TRADOC) position, policy, or decision unless so designated by other official documentation.

Exempt under Exemption 5 of the Freedom of Information Act, 5 USC552(b)

Protective markings may be removed upon DA approval of the Study.

~~FOR OFFICIAL USE ONLY~~

TRAINING EFFECTIVENESS

ANALYSIS SUMMARY

TABLE OF CONTENTS

Page

INTRODUCTION TO TRAINING EFFECTIVENESS ANALYSIS.................... 1

ANNEXES

ANNEX A, TRAINING EFFECTIVENESS ANALYSIS 1978.................... A-1

APPENDIX 1 TRAINING EFFECTIVENESS ANALYSIS 1978 MANAGEMENT SYSTEM PACKAGE.......................... A-1-1

APPENDIX 2 TRAINING EFFECTIVENESS ANALYSIS 1978 TEST SYNOPSIS...................................... A-2-1

ANNEX B, TRAINING EFFECTIVENESS ANALYSIS 1985.................... B-1

APPENDIX 1 CORE OBJECTIVES AND SITUATIONAL VARIABLES... B-1-1

ANNEX C, TRAINING EFFECTIVENESS ANALYSIS 1979.................... C-1

APPENDIX 1 TRAINING EFFECTIVENESS ANALYSIS 1979 CORE OBJECTIVES AND SITUATIONAL VARIABLES.......... C-1-1

ANNEX D, QUALITY LEVEL DEFINITIONS............................... D-1

PREPARED BY:
LTC Gary W. Bloedorn
LTC William Valen
LTC Thomas R. Stone
LTC Peter T. Zielenski

~~FOR OFFICIAL USE ONLY~~

TRAINING EFFECTIVENESS ANALYSIS SUMMARY VOLUME

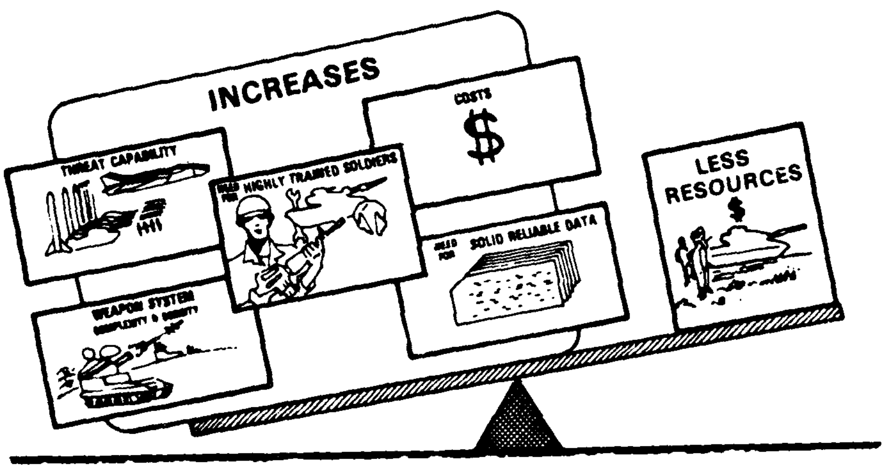
(TEA)

PURPOSE

The purpose of this paper is to describe the Training Effectiveness Analysis (TEA) as it was used and refined by members of the Army Training Study (ARTS); to summarize significant findings of the various tests; to outline future test requirements, and to set forth ARTS TEA conclusions, recommendations, and observations.

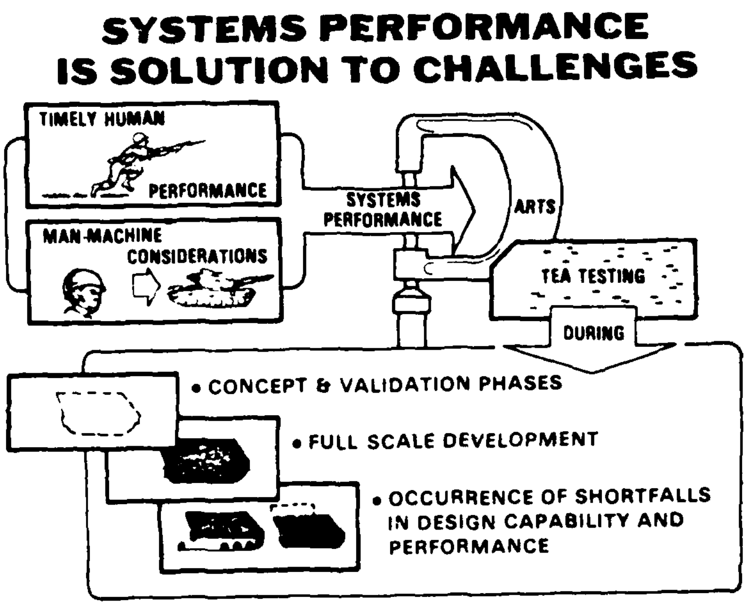
In describing the TEA, the reader will be introduced to the concept of the present TEA and the relationship of TEA to the Army Training System. Three TEA programs will be discussed. The ARTS developed near term TEA programs called TEA 78, was designed to collect data on fielded pacing systems and Military Occupational Specialities (MOSs). A second TEA Program, TEA '85, was designed to collect performance data on developmental systems. A third TEA program, TEA '79, is structured to complete TEA '78 testing, test key ARTS concepts, collect confirming data for the Battalion Training Model (BTM), and allow an orderly transition to TEA 85.

CHALLENGES TO ARMY TRAINING



Significant trends facing today's Army pose unique training challenges. The increasing capability of the threat, combined with present and future US systems complexity and density and with attendant cost

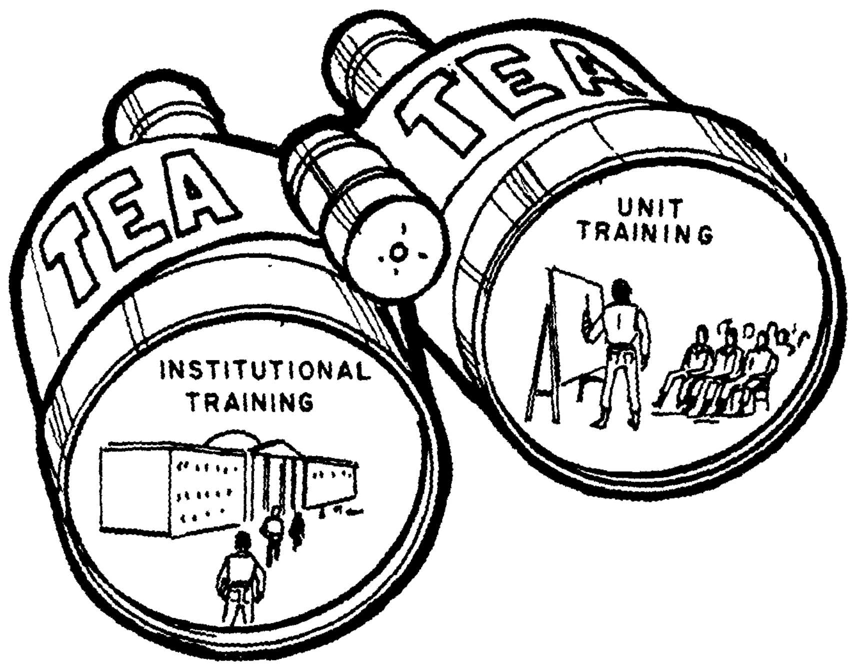
increases, requires soldiers who are trained to, and maintained at, a high level of proficiency. If recent trends continue, the Army cannot rely on increased resources alone to meet these challenges. While better training appears to offer the most promising solution, there is urgent need to provide solid reliable data to assist Army commanders in making the best possible training and resource decisions. In today's high threat environment the margin of error is small.



The Training Effectiveness Analysis (TEA) is an appropriate tool to use to collect the needed reliable data. The TEA has been designed by TRADOC to provide data about alternative training programs in terms of costs and effectiveness, and to aid in selection of the most efficient training program. TEA results provide the basis for identification of precise mission performance standards.

The TEA is also conducted to provide data about costs (people, dollars, and time) required to gain proficiency by use of each of these specific training program alternatives.

ROLE OF THE TEA



The evolving Army Training System must be readily understood and useable by all levels of the defense community. As an emerging technique, the Training Effectiveness Analysis (TEA) has been used by the Army Training Study (ARTS) to determine proficiency development profiles across a broad spectrum of combat, combat support and combat service support job requirements. The role of the TEA within the ARTS study is to provide data necessary to exploit known and potential advances in instructional/ training technology.

As the initial ARTS effort ends, testing has been completed on most pacing systems, yet much remains to be done. Development of prototype methodology needed for TEA 85 programs is just beginning with XMI Operational Test (OT) II; testing of forward observer training continues; and follow-on testing of command group training techniques is needed. Success of the prototype BTM highlights the need to test BTM derived training concepts and programs. Lastly, use of the TEA has already produced useful data and insights concerning refinement of the test process to meet future developmental training challenges.

The TEA was also chosen as a device to analyze both institutional and unit training. This approach was considered to be particularly appropriate, as TEA had been designed by TRADOC prior to the initiation of the ARTS effort to facilitate the analysis of training alternatives through testing. The innovative concepts behind the TEA had been formulated by TRADOC and, thus, useful data concerning training requirements and what had to be done to enhance the TEA process was already available when the study began. Results of TRADOC initiated TEA were provided throughout the period of study. TEA concepts and procedures presented in this paper have drawn heavily on previous TRADOC products. ARTS findings are that an effective TEA is a vital part of the training system.

REASONS FOR CONDUCTING TEA

TEA have different purposes depending on when they are conducted.

a. During concept and validation phases of hardware and support subsystem design, a TEA is conducted to provide data concerning human considerations that will allow trade-offs in design to facilitate training.

b. During full scale development of equipment, a TEA provides data to be used in the selection of the most efficient training subsystem within constraints of hardware design, personnel, and logistics subsystems.

c. A TEA is conducted whenever changes in the environment, over time, degrade the compatibility of subsystems to the point where performance proficiency falls significantly short of system capability.

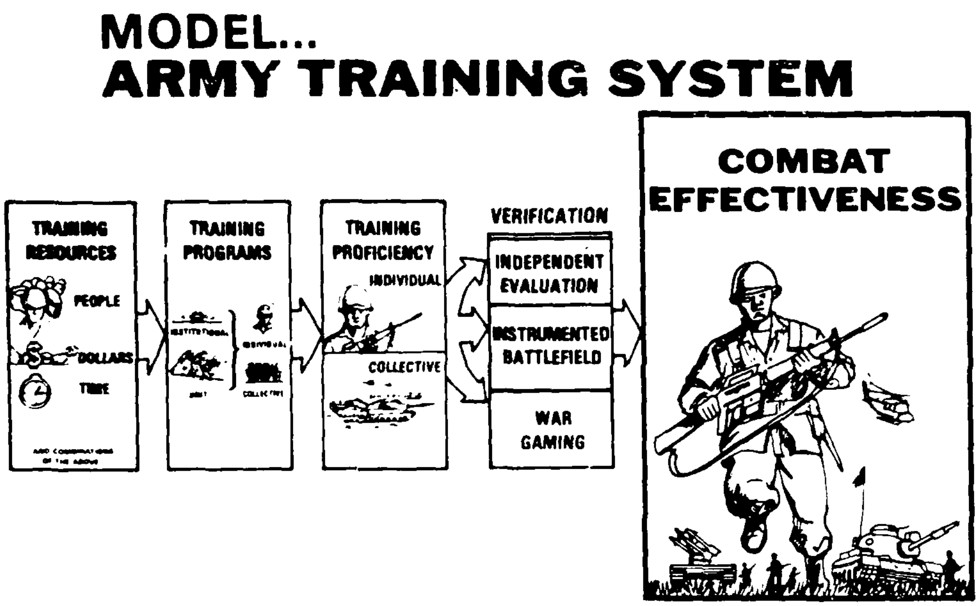
d. Finally, a TEA should be conducted to match requirements in support of design of training packages to meet operational problems. Examples of these problems can be found in the unique training challenges facing Reserve Component units, the problems of training with reduced resources (people, dollars, and time), and training to maintain proficiency under the severe conditions of turnover and turbulence. Whenever a TEA is conducted, however, the TEA must inform decision-makers about the effectiveness and cost implications of alternative training programs, techniques, and concepts as related to specific weapon systems, equipment, and job performance. It is clear that required proficiency cannot be reliably attained and maintained unless equipment, training programs, and documentation are appropriate for use by field units. TEA are conducted to ensure that training, equipment, personnel and logistical subsystems are molded into a more effective total system.

WHO PERFORMS TEA?

TEA are normally performed by a study team led by the training developer from the appropriate TRADOC school or center. Because the TEA process collects and analyzes data across the spectrum of human performance and equipment development disciplines, study groups are

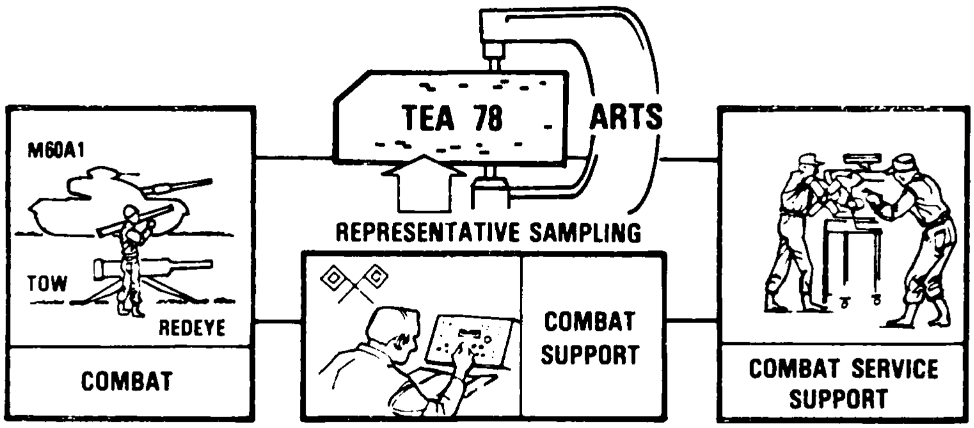
required with representation from such organizations as the Army Research Institute (ARI) for human performance factors; TRADOC Systems Analysis Agency (TRASANA) to analyze and integrate data, and the DARCOM Humán Engineering Laboratory (HEL) to ensure equipment compatibility with the training and learning processes.

TEA RELATIONSHIP TO TRAINING SYSTEM



The ARTS Model provides rationale to justify resources required to train to threat defeating standards. The ARTS TEA is designed to provide data in support of this rationale through rigorous tests by relating resources (people, dollars, and time) used in the training base and unit to attain and maintain a specified level of individual and collective training proficiency. Further, the TEA provides data necessary to develop standards of proficiency and methods to verify attainment of these stanards. Because TEA procedures provide for controlled data collection, the TEA product can be used for input to verification techniques. In this manner, it is possible to more precisely estimate the effects of individual and collective performance on combat effectiveness.

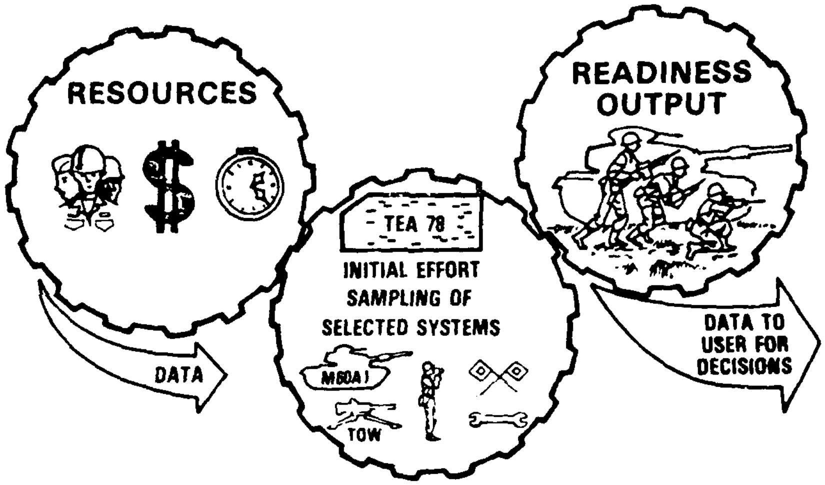
TEA 78 PROGRAM



The TEA forms an integral part of the ARTS analysis and is a continuing process vital for use of the ARTS Model of an Army training system. Three TEA progams--TEA 78, TEA 85, and TEA 79--have been designed by members of the ARTS group and will be discussed in turn.

The TEA 78 program was originally designed to collect limited data on selected combat, combat support, and combat service support pacing systems and MOSs. The primary purpose was to provide initial data as to essential elements of information in the study directive. Data provided by TEA is essential, for while the ARTS model provides a conceptual framework, information is needed to provide answers to questions posed by the model, to verify relationships established in the model, and to confirm the survey data used in the BTM. Due to resource constraints of people, dollars, and time, data collection was limited to three major sources: TEA add-ons to previously scheduled tests, quick-response tests designed by ARTS personnel, and reliance on other recently completed tests and studies.

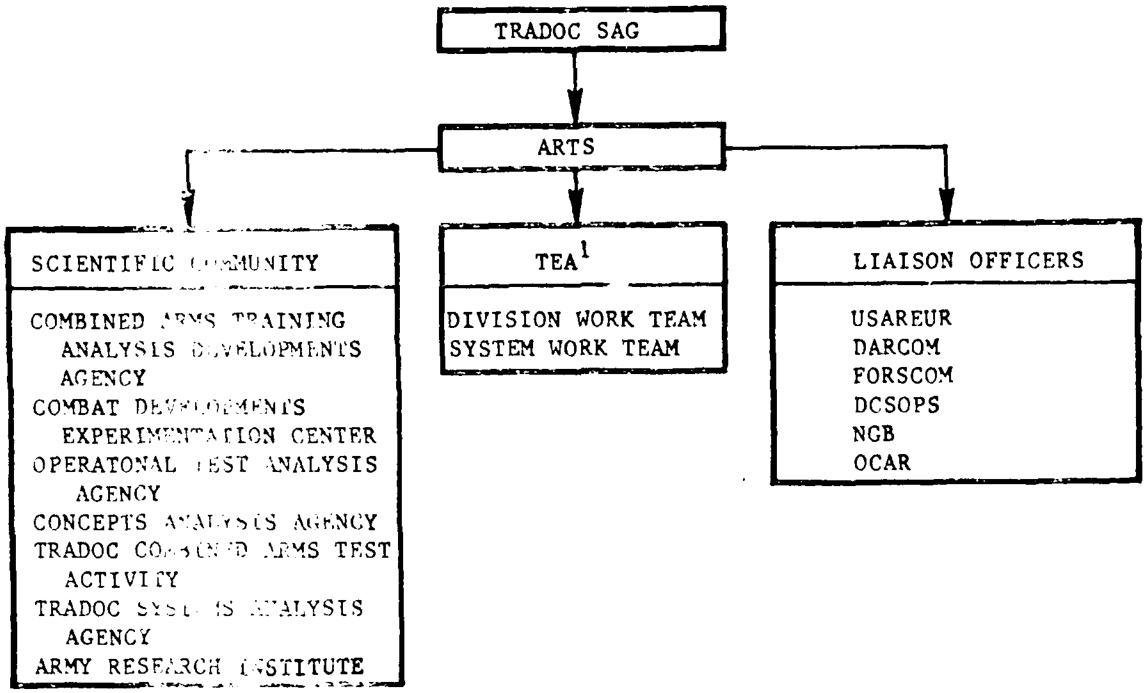
TEA RELATION TO TRAINING READINESS



As shown above, the TEA process provides a methodology to relate training resource input to readiness output to provide a body of data to be used to formulate the best possible training recommendations to be proposed to decision makers. The TEA 78 program served as a prototype to develop this methodology.

The TEA 78 program consisted of a series of tests on the M60A1 tank (11E), the Redeye Air Defense System (16P), the TOW (11H), forward observer (13F), 63C/H mechanic and 05C radio operator. TEA 78 results have provided valuable insights and data concerning present day Active Army training and proficiency in both the institution and in the field. Through the medium of planning, coordinating testing and visits to test activities and units, members of the ARTS study group have also gained valuable insights and experience concerning the problems of conducting TEA and making refinements that are necessary to ensure the process is equal to the challenges posed by planned modernization and personnel programs. A summary of TEA 78 test results is presented in this paper. A synopsis of all tests and test results is contained in Annex A.

ARTS ORGANIZATION FOR TESTING



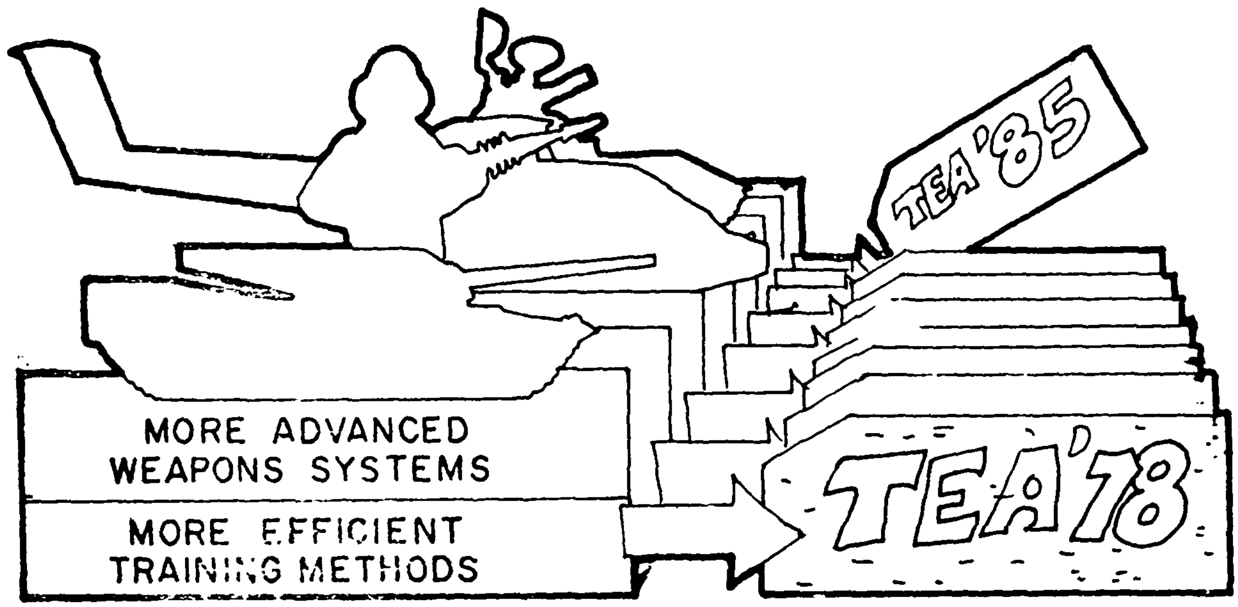
Subsequent to completion of TEA 78 test design and coordination, responsibility for execution of the TEA 78 program was given to the Commandants of the proponent TRADOC schools. These Commandants were to be supported by Army scientific agencies such as ARI, TRASANA, and the Combat Development Experimentation Command (CDEC). Most TEA 78 test reports were scheduled to be provided to ARTS by 1 July 1978.

---

[1]DWT = Division Work Team. ·Formed with each participating division. Normally overwatched by the Division Chief of Staff.

SWT = System Work Team. ·Formed with each TRADOC school. Chaired by the School Commandant or his representative.

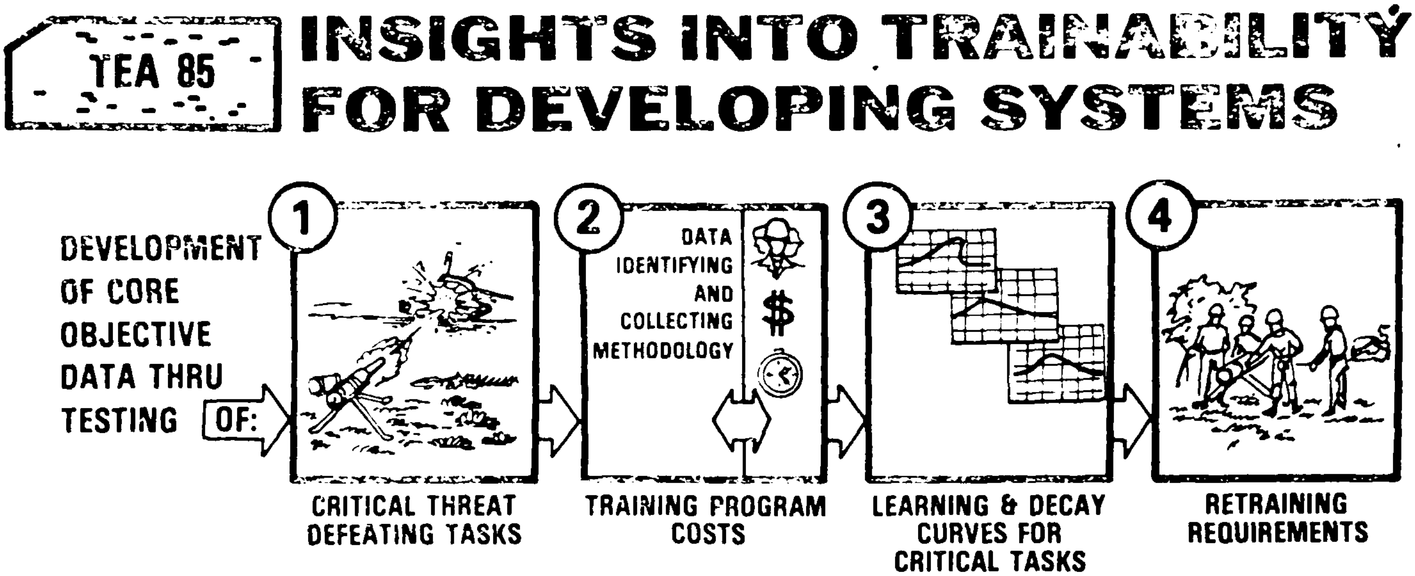
TEA '85



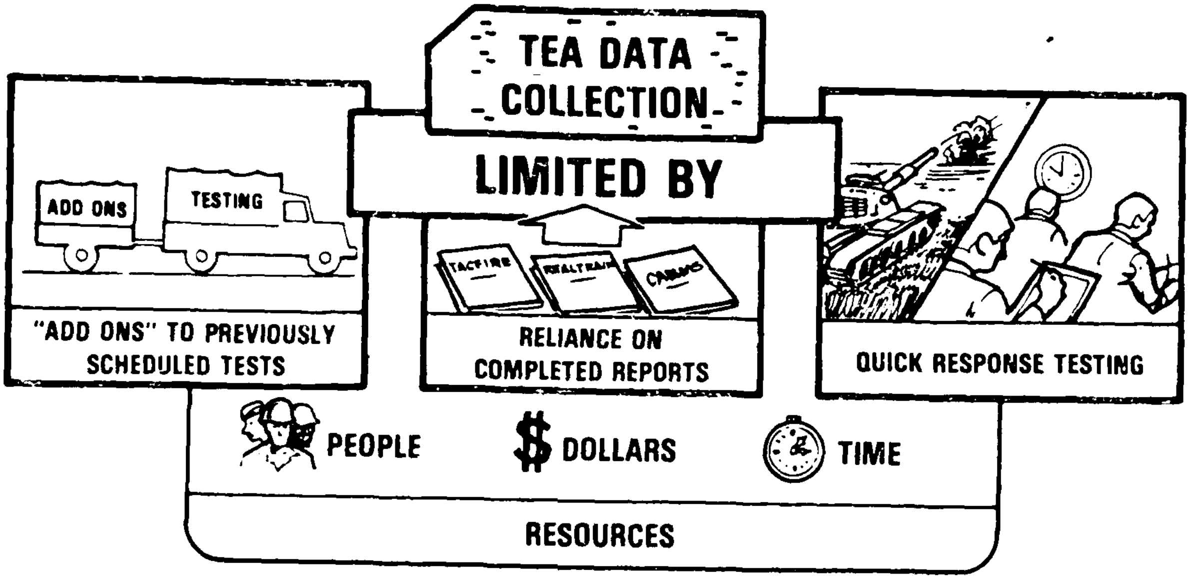
When TEA '78 was passed from ARTS to the TRADOC schools for execution, members of the ARTS group started planning for TEA '85. The purpose of the TEA '85 program is the collection of data to ensure through the development of an effective, efficient, and justifiable training system, the timely and effective assimilation of new, complex, weapons systems scheduled to enter the Army between 1978 and 1985.

Types of approaches introduced in the program include the performance decay analysis and survey techniques being piloted by TEA '78. The TEA '85 program also introduced two additional concepts: core objectives and situational variables. These concepts arose from interim ARTS observations.

CORE OBJECTIVES AND SITUATIONAL VARIABLES



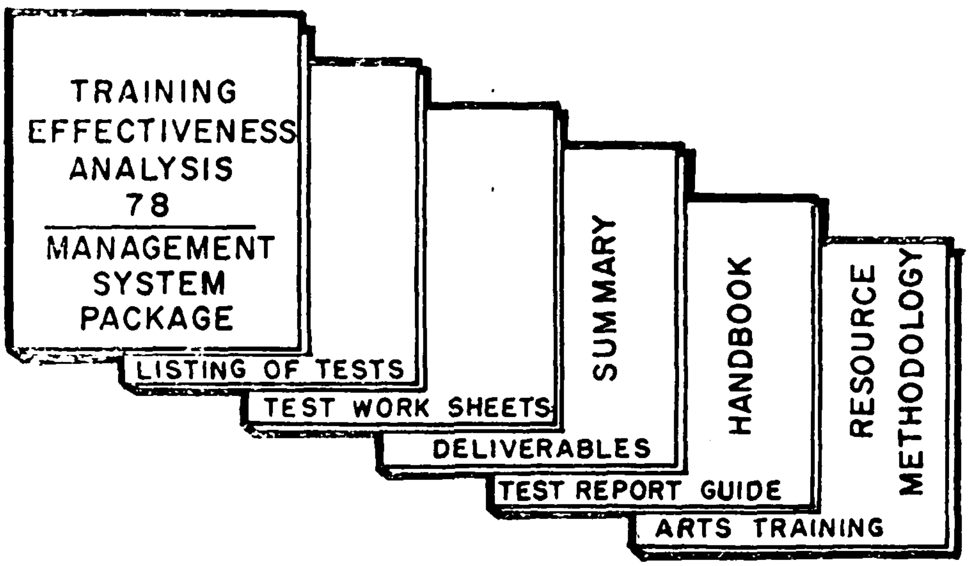
Core objectives, common to all tests, were specifically designed to test for key issues in order to guide the subsequent development of suitable training packages for '85 systems and to feed the ARTS model and BTM. These core objectives must be satisfied to ensure valid training testing. Collection of data on threat-oriented critical tasks, training costs (people, dollars, and time), performance decay for individual and collective critical tasks, and the frequency of retraining required to regain proficiency is needed to enable commanders to make early trade-off decisions between hardware design and alternative training programs. These trade-offs can best be made early in the development cycle before hardware design is frozen. Therefore, the investigation should be made while weapon systems and equipment are still in the development stage. Early collection of data is essential to the formulation of proper solutions to these problems. Such solutions might include well thought out changes to the personnel, logistics, and training subsystems so that the weapon or equipment under development can be expected to perform at, or above, design capability. The TEA '85 program provides a framework for investigation of these operational problems during testing. While operational problems vary in intensity from unit to unit, most of them are faced to some degree by today's trainers. These operational problems have been termed situational variables. They range from personnel manning conditions, reduced time to train, and training with reduced resources, to training for special operations and conditions. A discussion of these situational variables and core objectives is at Annex B, TEA '85.



CONCEPT OF TEA '85

Due to the limited time and money available, the proposed TEA '85 test plan recommended gradual test development. Initial testing was focused on "piggybacking" or "adding on" to already scheduled OT's and Weapons Systems Training Analyses (WSTEA), proceeding from tests of minimum resource requirements in the short term (individual, section, platoon requirements, etc.) to greater resource requirements in the long term, and proceeding from simple test to complex tests (complexity of equipment, level of skill, etc.). For instance, for the near term effort, the XMI OTII test (May-Dec 1978), in which only a tank platoon is involved, was selected to address the relatively simple but most important core objectives, as well as situational variables relating to MOS transition training and new equipment assimilation. The long term, the XMI OTIII (Jun-Dec 1980), in which an entire Armor battalion is involved, was selected to address the more complex variables of resources required to attain unit proficiency, equipment pools, and equipment survivability training as well as the effect of less capable trainees, increased turbulence, and trainer grade substitution. The test program provided for testing within the framework of the ARTS Model, and included tests of weapons, equipment, individual MOS, unit training tests, testing of command groups, and of Reserve Components. Planning provided for full implementation of the concepts to all operational testing beginning in FY 1982.

TEA '78 MANAGEMENT SYSTEM



Actions taken to upgrade the quality of the ARTS TEA tests are aggregated under one cover in the TEA '78 Management System package at Annex A.

The TEA '78 Management System package provides:

a. A summary listing of tests included in TEA '78 as well as a listing of additional tests which were selected for inclusion in the TEA because of their potential to provide information which would upgrade, expand, and/or validate needed data.

b. Work sheets for each test which served to coordinate major test milestones and activities by outlining test objectives, sample sizes, links to the ARTS model, major test activities, and scheduled dates at which SWT or test agency reports were due. These worksheets served to coordinate major test milestones and activities.

c. A summary of TEA '78 deliverable products which portrayed test activities in terms of the various areas of training interest, and linked each TEA '78 test with different aspects of ARTS to include the BTM and TEA '85 core objectives and situational variables. This linkage served as a planning guide for test agencies to extract additional data from on-going tests.

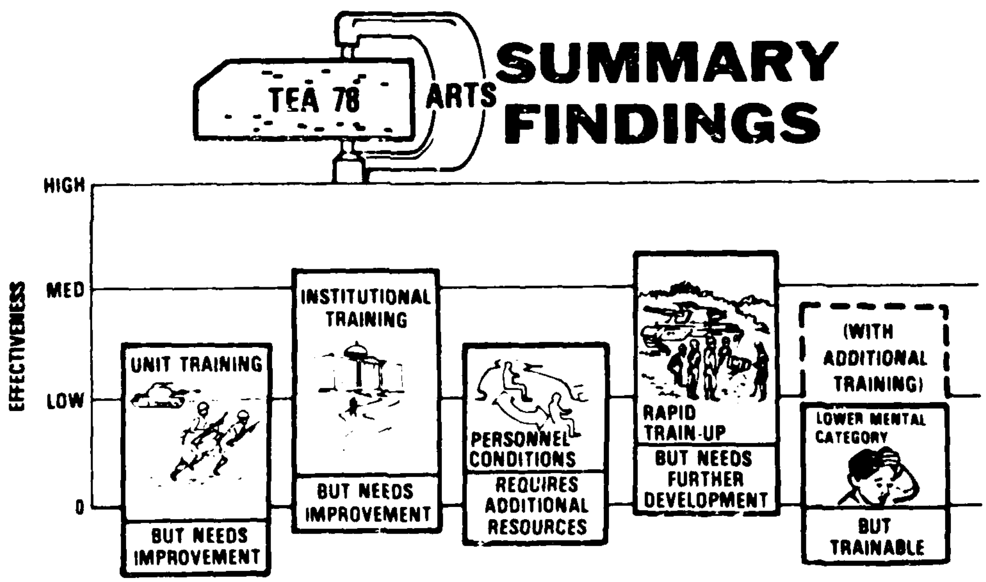
d. An ARTS designed reporting handbook which provided a common format for the study of test results and conclusions. The utility of this handbook was that it enabled ARTS action officers to synthesize numerous reports. Use of this technique facilitated cross-referencing of data,

established consistency, and provided continuity of effort within test agencies supporting ARTS. The handbook also used an alphanumeric code to identify elements of information in relation to the ARTS Model. Using this system, ARTS analysts can synthesize data relating to any segment of the ARTS model across the full range of TEA '78 data. Elements of information can be assembled into new combinations or contrasted as appropriate. As an example, costs of individual training in the institution for MOS 11E, 16P, and 63 C/H can be arranged quickly into one module for comparison/contrast as desired. The system used to code elements of data also forms the foundation for the ARTS data base. This data base is a computerized data retrieval system which should be developed apace with TEA 79 to serve as a common repository for TEA/survey data. Designed to be compatible with the BTM, the data base is an essential element in the linking of TEA with the BTM.

e. An ARTS training resources methodology which was formulated early in the study, was designed to provide guidance for collecting data for the development of relationship between resources and training conducted in the training base and in the unit. It contains cost factors, costing ground rules, input requirements, and common reporting formats.

The ARTS Staff coordinated all elements of the updated TEA '78 program with proponent TRADOC school SWTs and supporting analytical agencies and MACOM liaison officers. This coordination is discussed in the memorandum at Incl 5 of Appendix I, Annex A. The experiences gained in planning for and conducting TEA '78 have also served to generate a broad body of knowledge necessary for the conduct of TEA '79.

TEA '78 SUMMARY OF FINDINGS



Although TEA '78 tests were limited to several key systems and MOS, some general indicators of the overall status of training in the Army were developed. These indicators seem to apply across the total force.

Test results suggest that the overall level of Army training and proficiency may be low. Trends that emerge as general across the ARTS sample include shortfalls between actual system performance and design capability (this is particularly true of tank crews and mechanics); low levels of successful soldier's manual task completion in units, particularly in operator maintenance skills; significant numbers of lower mental group personnel entering the force with some attendant increased training requirements; low levels of training management competence and leader skills on those individual SM tasks they are expected to supervise; and expressed dissatisfaction with training and maintenance conditions and procedures (68% of 1288 tank crewmen surveyed in the M60A1 Modified WSTEA Study chose to comment on the survey as to unit training improvements needed). Most of the comments were negative and stressed a recurrent theme that training, proficiency, and equipment maintenance were poor.

In contrast, although limited in scope, the REALTRAIN tests and the rapid train-up of tank crewmen tests (27 tank crews total) demonstrated the performance potential characteristic of good training. Demonstrated performance of SL 1 soldiers in institutional training was high and skill retention was not discouragingly low. Today's soldier appears to be trainable and eager to train. It would appear that the absence of solid, planned training is the cause of much of the poor performance noted.

A summary of test results follows. The ARTS assessment of the quality level of the data (explained in Annex D and available as a fold out on the last page of this volume) is portrayed with each finding:

<u>TANK</u>	<u>QUALITY LEVEL</u>
. A large percentage (50 percent of armor crewmen tested in the proficiency and retention study) had not, within 2-25 weeks of joining units, been assigned to a tank or if assigned had not been given a specific crew position. (n = 270)	(QL 2)
. Approximately 50 percent of armor crewmen participating in the M60A1 WSTEA claimed to have fired table VIII in a tank other than their own. (n = 356 tank crews)	(QL 1)
. No significant difference has been found between levels of turbulence in CONUS and USAREUR tank battalions. (Care must be exercised in extrapolating this data to all CONUS units. Battalions surveyed had been stabilized to support forward deployment commitments, i.e., Bde 78 type rotation).	(QL 4)

TANK	QUALITY LEVEL
. Survey data indicates that average daily present for training percentages across 30 tank companies in CONUS and USAREUR are below 70 percent of authorized strength.	(QL 3)
. During the test program, personnel in mental category III constituted the majority of entry level soldiers in MOS 19E/F. (Unable to distinguish IIIA from IIIB)	(QL 1)
. Instability is endemic in tank units tested. Data collected indicates that most turbulence of crew members occurs within tank units at company level and below. This finding is consistent with tank force management group conclusions that more than "55 percent of all turbulence was generated within the battalion." Stability profiles of ten M60A1 battalions in USAREUR and CONUS showed mean time in units to be:	(QL 2)

USAREUR	CONUS	
Company - 16 mo.	15.3 mo.	
Platoon - 12 mo.	12.6 mo.	
Tank - 3.3 mo.	3.0 mo.	(Months since change in tank crew)

. The majority of tank crewmen indicated the need for more and better training in their units. (n = 1288)	(QL 2)
. Tank unit training programs require improvement. Units demonstrated a lack of ability to plan and conduct training leading to performance improvements. Proficiency and retention testing established that Basic Armor Training (BAT) graduates received little or no training on basic armor crewmen skills since joining the unit. Training that had been conducted did not result in proficiency (n = 270). These findings were reinforced by the low performance levels of 63C/H, 05C, and 19E tank commanders and gunners in all-related testing.	(QL 3)

TANK	QUALITY LEVEL
. A higher degree of learning occurs within the institution than in the units for Armor crewmen. Retention testing by the US Army Armor School established a 96 percent "Go" rate on tank crewmen skill tests regardless of mental group. Follow-on testing established a 20% performance decay in SM tasks occurring 2 weeks after unit assignment and leveling off without further decay through 25 weeks after unit assignment. Performance decay was significantly greater among lower mental groups (n = 220).	(QL 3)
. Training programs for Armor crewmen should emphasize training time of tank commander and gunner together.	(QL 1)
. The more training a tank commander receives, the shorter the opening times. The pronounced effect of leader dominance leads to a conclusion that crewmen should be trained up to tank commander skills as well as cross-trained.	(QL 1)
. The more training a gunner receives, the more main gun hits the crew achives.	(QL 1)
. Tank crew gunnery knowledge demonstrated by key personnel was often low. Seventeen and 21 percent of the tank commanders in USAREUR and CONUS respectively did not know where to aim when employing battlefield gunnery techniques (battlesights). Further, twenty-one and 28 percent of the gunners in USAREUR and CONUS respectively did not know where to aim when using battlesights (n = 356).	(QL 2)
. Tank crew probability of main gun hits at range (Ph) was input to the tank exchange model (TXM) resulting in blue/red exchange ratios. Exchange ratios indicated that tank crew proficiency is 40 to 50 percent below what it would be if the crews fired the quasi-combat Ph in USAREUR and CONUS respectively (n = 356).	(QL 2)
. Changing Armor crewmen positions without training the crewmen specifically for the new position leads to reduced crew performance.	(QL 3)

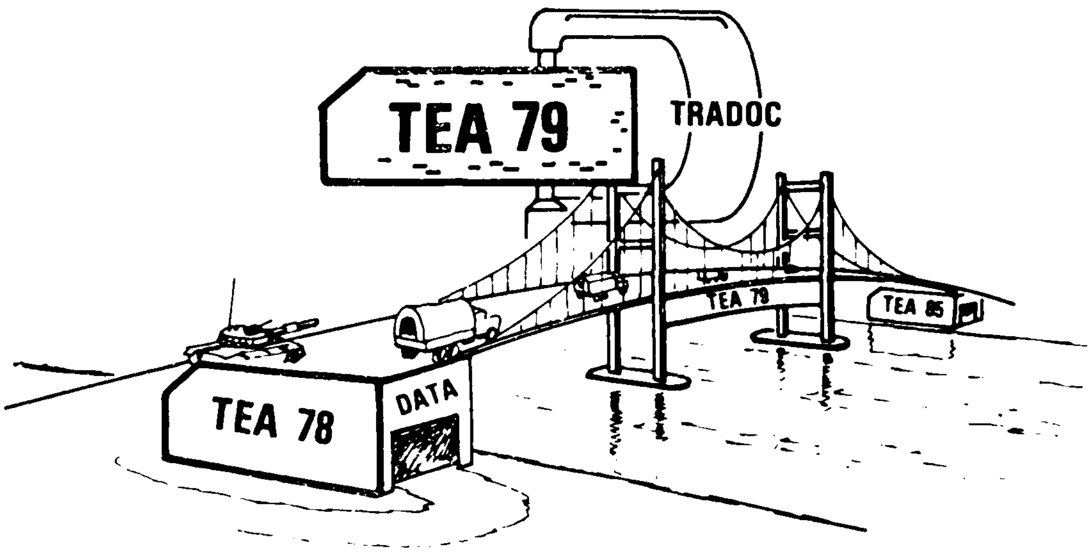
TANK	QUALITY LEVEL
. Indications were found that intensive, narrowly focused training to criteria on critical tasks (modular training) can result in rapid acquisition of tank crew proficiency if an experienced, proficient leader is present. Additional testing is required both to validate the concept of modular training for Reserve Components (RC) and wartime replacements and to confirm the extent of leader dominance on tank crew performance.	(QL 3)
. As presently employed, table VIII is a poor measure of performance. Criteria for scoring varied significantly between battalions in USAREUR, and between USAREUR and CONUS while range limitations of table VIII in USAREUR precluded realistic use of precision gunnery techniques. Tanks in USAREUR and CONUS are restricted to movement on the road and do not employ fire on the move (AOS) techniques. Consequently, use of table VIII scores as a measure of proficiency is of doubtful utility.	(QL 4)
. Lower mental category personnel can be trained to proficiency. (96 percent + of CAT III and IV performed satisfactorily on the mid-cycle and end-of-cycle tank crewman qualification tests administered at the Armor Center). (n = 286 & 150 repectively).	(QL 3)

REDEYE	
. Current levels of training resources are required if Redeye gunner proficiency is to be maintained.	(QL 3)
. Additional Moving Target Simulators (MTS) are required to support units in close proximity to existing MTS and to provide for more retraining for lower mental category personnel entering the MOS.	(QL 3)
. Redeye Launch Simulator (RELS) should be procured as a training aid.	(QL 3)

REDEYE	QUALITY LEVEL
. Allocation of live Redeye rounds for Annual Service Practice (ASP) should remain the same.	(QL 4)
. Significant correlations between training frequency and length of time spent on Moving Target Simulator, (MTS) and Range Ring Profile (RRP), and proficiency were found in Redeye testing.	(QL 1)
. CAT IV Redeye gunners are able to achieve an acceptable level of proficiency in MTS training, but demonstrated unacceptable performance levels in use of the RRP.	(QL 1)
. Determination of range ring coverage is the most difficult task for all gunners of all categories with respect to the RRP.	(QL 1)
. Lower mental category personnel can be trained to proficiency. Indications, however, are present that it takes longer and that more frequent refresher training is required. This is consistent with literature research. (An exception appears with CAT IV Redeye gunners and the RRP. CAT IV personnel were unable to learn the RRP (n = 91.)	(QL 3)
63 C/H Mechanic	
. Experienced maintenance personnel in the unit (grades E-4--E-7) performed at a low level. This level was equivalent to the SL 1 AIT graduate. Essentially performance remained the same, over time.	(QL 2)
. Demonstrated job performance levels of 63C/H personnel are such that equipment operational rates could be reduced severely if: - mechanics were required to work across the broad spectrum of their MOS as they would have to do in wartime rather than operate in narrowly focused areas as they often do today. - replacement parts availability were restricted it would be in wartime and maintenance depended on diagnostics and repair.	(QL 4)

CAMMS	QUALITY LEVEL
. Initial testing indicates CAMMS to be an effective training tool to raise command group performance. Additional testing is required to confirm this and to determine the degree of improvement achievable.	(QL 3)

TEA '79



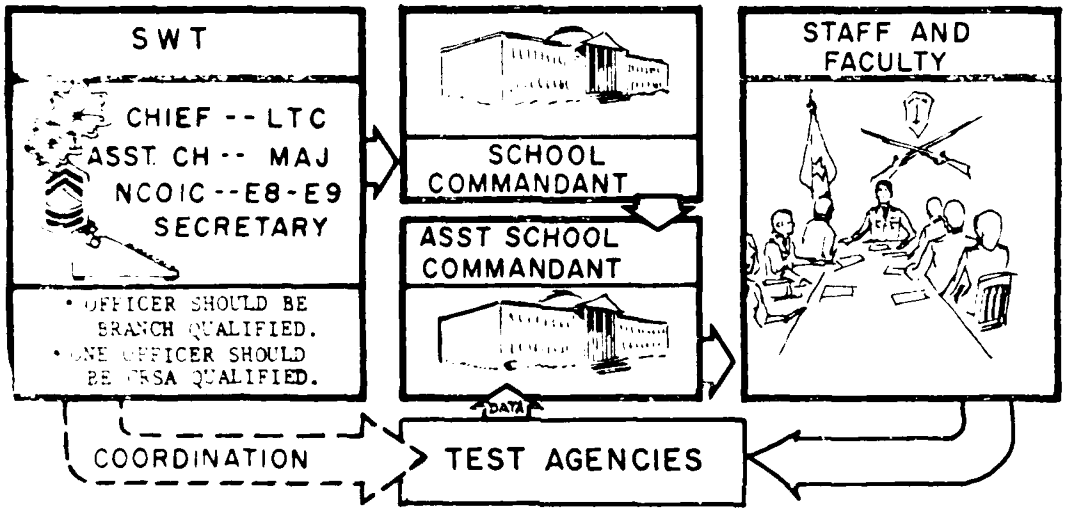
The TEA '79 program takes advantage of lessons learned in TEA '78 and serves as a bridge to TEA '85. The program is in fact second generation TEA testing designed to capitalize on "Lessons Learned" and to retain the momentum gained during the study. The program is comprised of ongoing tests not yet completed in the TEA '78 series and proposals to initiate tests determined to be required as a result of the ARTS study findings.

CONCEPTUAL ORGANIZATION FOR TEA '79

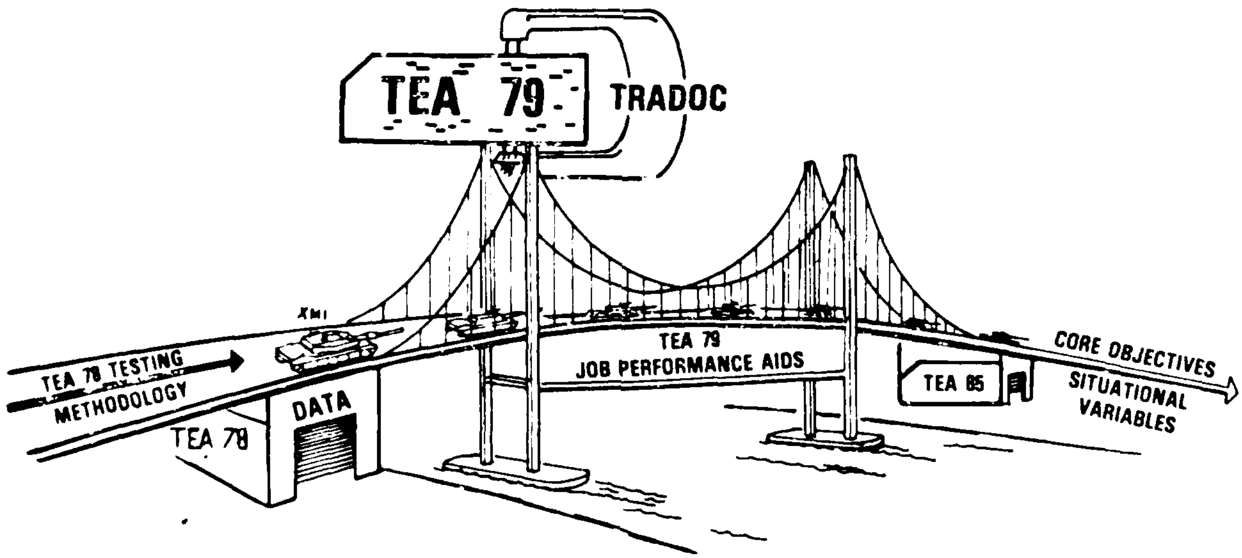
The organization best suited for conduct of the TEA builds on the experience of personnel now serving in the SWT and analytical agencies. Many of these personnel are continuing to conduct holdover TEA '78 tests. Participation in TEA suggests that each service school commandant establish a nucleus of field grade officers (one of whom is ORSA-qualified) augmented by a small administrative staff. The SWT should report to the

Commandant as execution of SWT duties requires coordination across the broad spectrum of school directorates and MACOM staffs. A phased approach to institutionalization appears appropriate. A recommended approach for FY 1979 is to continue the TEA '78 SWT as presently organized and to establish new SWT as additional schools become involved in testing. In FY 1980, it would appear appropriate to integrate the SWT into the DTD of the schools and centers if TEA developement has proceeded as planned.

CONCEPTUAL ORGANIZATION
FOR TEA 79



TEA '79 TEST PROGRAM



Eleven ongoing tests and studies from TEA '78 have been incorporated in the TEA '79 program. They include armor reserve component testing, forward observer testing, the TOW TEA test, training instrumentation testing (TIE Test) and research into artillery cannon crew turnover and retention of common skills.

Test initiatives include research into tank crew performance potential through stabilization; follow-on command group training through use of CAMMS and CATTS with eventual verification of proficiency gain on an instrumented battlefield, XM1 OTII, follow-on testing of 63C/H mechanics to determine the best way to use the proficiency of the training base to raise proficiency in the field, and additional testing of armor skill performance decay under more controlled conditions. The program also includes plans to test, with the aid of the BTM, units trained by the multiechelon, integrated training and the battle drill battalion training program developed by members of the ARTS study group.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions and recommendations are based upon TEA '78 findings, professional military judgements and lessons learned while developing the three ARTS TEA programs. Two areas of concern are:

- Training Effectiveness Analysis (TEA): The dominant finding across the spectrum of TEA-related activities is that the Army has only partially implemented the Instructional Systems Development (ISD) model. The ISD process is vital to an efficient and effective Army Training System, and to developmental testing of new equipment. Implementation of TEA process is essential to improved training.

- Training: Most of the performance tested during conduct of TEA '78 research fell short of existing standards. While the TEA program was not comprehensive, it did sample pacing systems and MOS across a wide spectrum of Active Component, and to a much lesser extent, Reserve Component units. Conclusions and recommendations regarding training are oriented toward improving terminal performance. Conclusions are formulated from test data, by synthesis of consistent trends and high resolution findings. Conditions which cannot be directly supported by specific data are presented as observations. These observations are the considered professional judgement of members of the ARTS group based upon on-site test evaluations, conferences, research, and intensive study of test results.

TEA Conclusions and Recommendations

CONCLUSION:

Efficient, timely conduct of TEA by use of the ARTS TEA model is essential to continued development of training data needed by the BTM.

RECOMMENDATION: PRIORITY 1

TRADOC (ARTS)--Continue development of ARTS designed training data base.

TRADOC--Institutionalize flow of data from TEA to data base, by continued development of data base system designed by ARTS Phase II.

Present TEA methodology and test proponent/agency capabilities are not sufficient for the tasks inherent in TEA '85. Problems identified by the TRADOC Staff include:

1. Inadequate performance criteria is available to testers.

2. Tests often poorly represent user operational problems.

3. Too little use is made of performance analysis techniques and available tehnology.

4. There are too few trained test planners.

RECOMMENDATION: PRIORITY 2

TRADOC:

a. Conduct TEA '79 as designed by the ARTS Study Group.

b. Develop methodology and fully proceduralized test model (as outlined by the TEA '85 program) supported by adequate job aids for developmental testing during conduct of TEA '79 in order to:

(1) Refine survey derive people, time and dollar costing data currently factored into the BTM.

(2) Determine training proficiency as a function of frequency of repetition.

(3) Provide data on training proficiency and relative costs as a function of sub-caliber substitution and employment of resource conserving gunnery training devices.

c. Transfer TEA '79 from ARTS Phase II to HQ TRADOC NLT 1 Oct 78.

d. Implement concepts outlined in TRADOC designed draft "TRADOC Systems Manager's (TSM) Guide to Training Development and Acquisition for Major Systems," dated 13 Dec 77, throughout the TSM and school training developments community in conjunction with TEA '79.

CONCLUSION:

1. Increasing threat capability, present and future systems complexity and density, with attendant cost increases, require soldiers and leaders who are sustained at a high level of training readiness.

2. The majority of enlisted accessions in test samples are mental category III and IV personnel who require enhanced initial training and more frequent refresher training to maintain proficiency.

3. Complex skills often require more frequent refresher training.

RECOMMENDATION: PRIORITY 3

TRADOC: Implement an expanded TEA '85 program to develop training sub-systems based on core objectives and situational variables phased as outlined below:

a. Implement TRADOC DCST TEA program for FY 79-80 as planned.

b. Implement ARTS TEA '85 program for FY 81-82 with testing of core objectives and situational variables. Planning complete for PARR submission NLT 1 Feb 79.

c. Apply TEA '85 methodology to all operational testing in FY 83.

CONCLUSION:

Due to a general absence of effective training in many units, unit training readiness is heavily dependent on institutional excellence. Efforts to upgrade training base capability are usually cost effective and are beneficial to unit collective training capabilities.

RECOMMENDATIONS: PRIORITY 1

TRADOC: - Develop a program coordinated with MACOMs to:

1. Capitalize on training advantages unique to the institution by:

a. Exporting institutional proficiency tests to the field.

b. Establishing a program of spot checking proficiency of replacements upon arrival in unit by these tests.

c. Exporting institutional training materials to support remedial training in the units of individuals found to be deficient.

2. Develop a full range of job aids to enhance performance by elimination, where appropriate, of the need for extensive recall.

3. Emphasize use of training manager instructional job packages.

4. Continue to expand "hands-on" training in officer and NCO basic courses so that the graduates will have competency in the tasks they supervise.

5. Initiate a program of periodic train-up for selected skills such at 63C/H mechanics, 05C radio operators, tank commanders and gunners by use of comprehensive exportable training packages which emphasize job aids and which are designed for use by officer and NCO unit trainers.

6. Establish a more feedback system to communicate training needs between users and the training base.

7. Prepare program and resource estimates by 1 Feb 79 for inclusion in PARR.

CONCLUSION:

There is a need to develop rapid train-up materials and other training support materials for the RC and early deploying AC units.

RECOMMENDATION: PRIORITY 2

TRADOC: - Develop rapid train-up materials for high density combat, combat support, and combat service support MOS critical tasks in accordance with the general ISD model. Based on TEA '78 results, priority should be given to MOS 19E/F, 63C/H, 16P in that order. Additional study, however, may be required to determine needs of other MOS critical to the Army's warfighting capability.

CONCLUSION:

Experiential learning techniques such as REALTRAIN appear to supplement effectively current conventional training. MILES and NTC development should be intensified.

RECOMMENDATIONS: PRIORITY 3

1. DA continue intensified efforts to develop a National Training Center.

2. MACOMS place command emphasis to encourage use of REALTRAIN and follow-on hit/kill simulation devices.

OBSERVATIONS:

Recognizable trends emerging across the sample of tests serve to reinforce intuition and professional judgments that the competence of those in leadership positions is vital to collective proficiency. For this reason the focus of training concepts and directives should rest on training of the trainers. Such a focus could be initiated by:

- conduct of performance testing at the top first, i.e., emphasize SQT testing at SL4 and 3 and initiate comparable testing of commissioned officers. Leaders should have competency in the tasks they supervise.

- Rely on unit officers and NCO's to train and assess the proficiency of SL 1 and 2 personnel.

Initiate second generation "How to train" manuals through implementation of training to collective tasks emphasizing training drills and battle drills. Instructions should focus on how to optimize multiechelon integrated training in conjunction with training program variations generated by the BTM to more precisely meet requirements of individuals units.

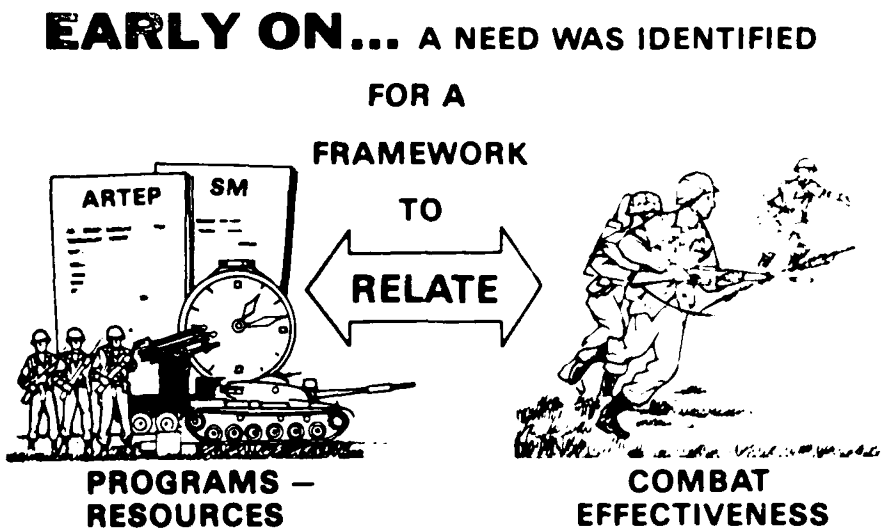
Implement a policy of stabilizing combat vehicle crew commanders and gunners as teams in their assigned units. Consideration should also be given to whole crew stabilization. The study group was unable to gain insights into the results which reasonably could be expected from this course of action because the effect of drivers and loaders on crew gunnery proficiency was not measured. It does appear, however, to be a reasonable course of action, and a test to determine actual effects of such stabilization has been included in the TEA '79 program.

Lower mental category soldiers were shown to be trainable in the institution. It appears, that a training environment dedicated to training--i.e., well organized, planned, implemented by officers/NCO's competent in the subjects they teach and in teaching and training--is required. Further, observations by ARTS members indicate that the training environment should be less encumbered by distractors such as schedule

changes, personnel absent from training and the like in order to ensure that the training can be focused to achieve the desired performance. Freedom from distractors is especially important as there is less "margin for error" in training the lower mental category soldier to proficiency. These are the soldiers who were in the majority in most test samples. Where unit training programs did not meet these prerequisites, performance to existing standards of proficiency was seldom attained.

APPENDICES:

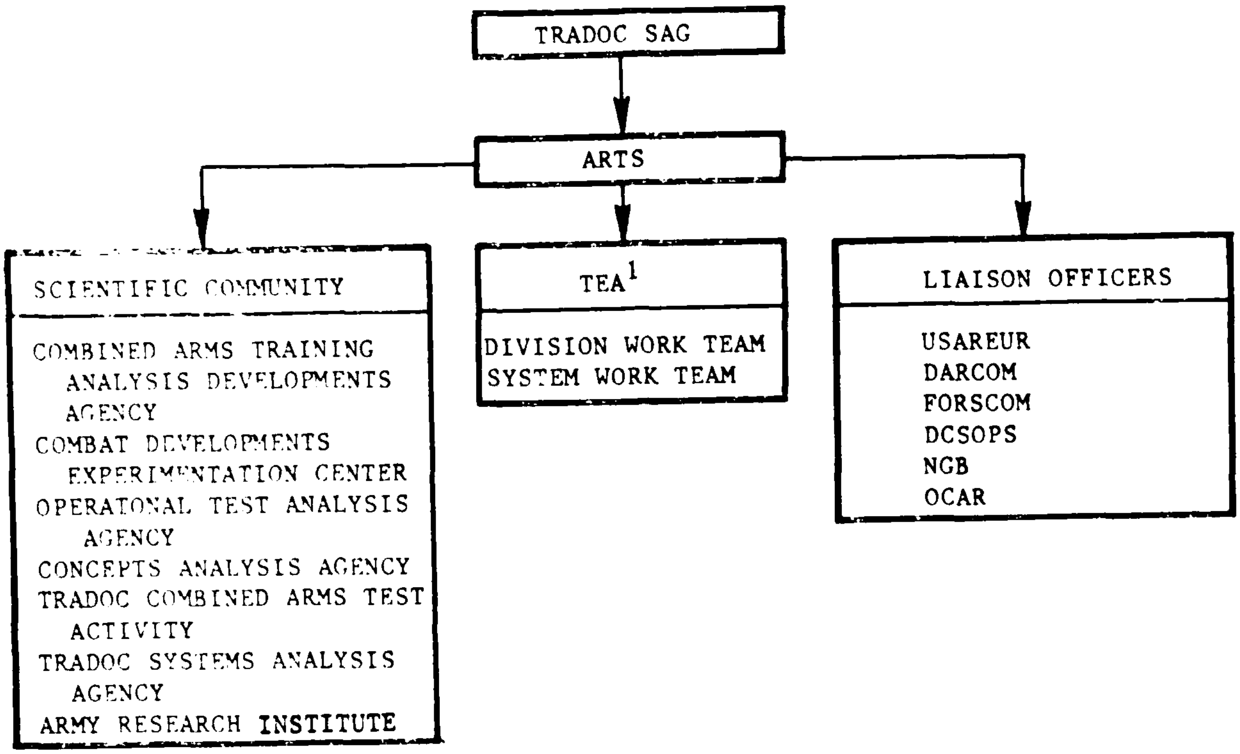
1. TEA '78 Management System Package
2. Test Synopsis



1. PURPOSE: The purpose of this Annex is to expand on selected aspects of TEA '78.

2. PURPOSE AND SCOPE OF TEA '78: As discussed in the basic document, the purpose of TEA '78 was originally to collect data from both the institution and the unit on selected combat, combat support, and combat service support pacing systems and Military Occupational Specialities (MOS). The initial data collected was to be used to assist in answering questions posed by the ARTS Model and to verify relationships established in the model. As the ARTS focus narrowed, the need for higher resolution data to replace survey derived data factored into the Battalion Training Model (BTM) served to place increased emphasis on the successful conduct of TEA '78 testing. TEA '78 collected data from both the institution and unit.

3. Organization For Conduct of TEA '78



a. ARTS. The role of the study group was to coordinate the conduct test initiatives prepared by each proponent TRADOC school. TRADOC schools were assisted, as appropriate, by various analytical agencies. Once begun, TEA '78 was passed from ARTS to the schools for execution. As the study narrowed and the need for high resolution TEA '78 data become more important, ARTS staff officers were charged with upgrading the TEA '78 program and with coordinating all aspects of the testing and data collection to ensure the timely collection of high quality data. The system devised to manage TEA '78, the ARTS TEA '78 management system package, is at Appendix 1 to Annex A.

[1] DWT - Division Work Team. Formed with each participating division. Normally overwatched by the Division Chief of Staff.

SWT - System Work Team. Formed with each TRADOC school. Chaired by the school commandant or his representative.

b. Division Work Team (DWT). This team was formed within each division which supported ARTS. These teams participated in the planning for TEA '78 tests and in making requested troop units and support available.

c. System Work Team (SWT). These teams were formed at each participating TRADOC school and were chaired by the school Commandant or his representative. The SWT was responsible for the development of the recommended study approach for weapons system and/or MOS for which the school has proponency. Team members then prepared study plans and coordinated the conduct of testing.

d. Members of the scientific community. Support to the study group was provided by the scientific community. Examples of the type support provided includes:

(1) Army Research Institute: Participated in the development and conduct of various tests, data reduction, and the revision of school test plans. (Examples: Tank Crew Turbulence Test, Anti-Armor REALTRAIN).

(2) Combat Development Experimentation Center: Provided professional support throughout the study and provided troop units to conduct portions of the tank crew moduler training program.

(3) TRADOC Systems Analysis Agency: Participated in the development and conduct of various tests (Examples: Redeye Engagement Test, modified M60A1 WSTEA).

(4) Combined Arms Training Developments Agency: Participated in the development and conduct of various tests. (Example: Computer Assisted Map Manuever).

(5) TRADOC Concepts Analysis and Test Agency: Participated in the development and conduct of various tests (Example: several infantry tests).

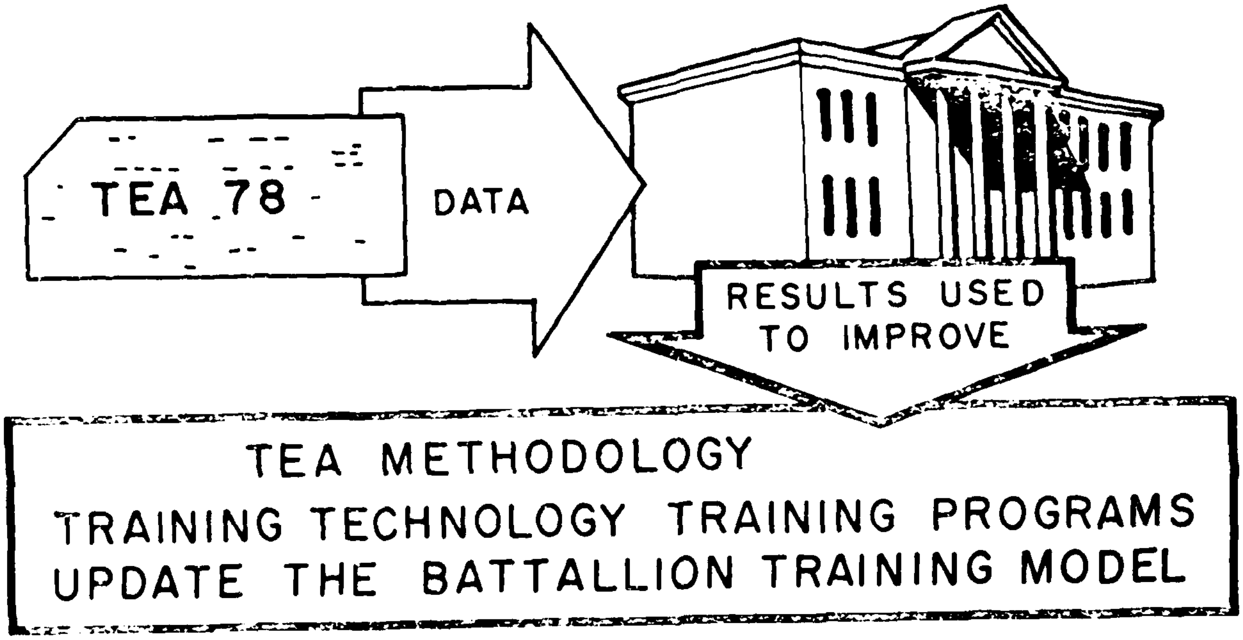
(6) Concepts Analysis Agency: Provided analytical support.

(7) Operational Tests and Analysis Agency: Provided information about operational testing procedures.

e. Importance or BTM. The prototype BTM is using survey derived data to describe the ARTS model to the computer. Survey respondents provided their judgments as to the length of instructional periods and frequency required to train to individual SM and unit proficiency on collective tasks and ARTEP missions. The integration of the resulting "required" hours within available training hours is done by the BTM in a pre-processing module. The integrated (reduced) program is then included in the annual battalion training program.

High resolution data from field testing is ultimately to be used to replace this survey derived data in the BTM. As previously mentioned, TEA '78 was upgraded to collect some of this data. A copy of the TEA '78 Management Package which details this upgrading effort is attached at Appendix 1 of Annex A.

Data produced by TEA '78 will be placed in data bank from which it can be withdrawn, as needed, to be used in the BTM.



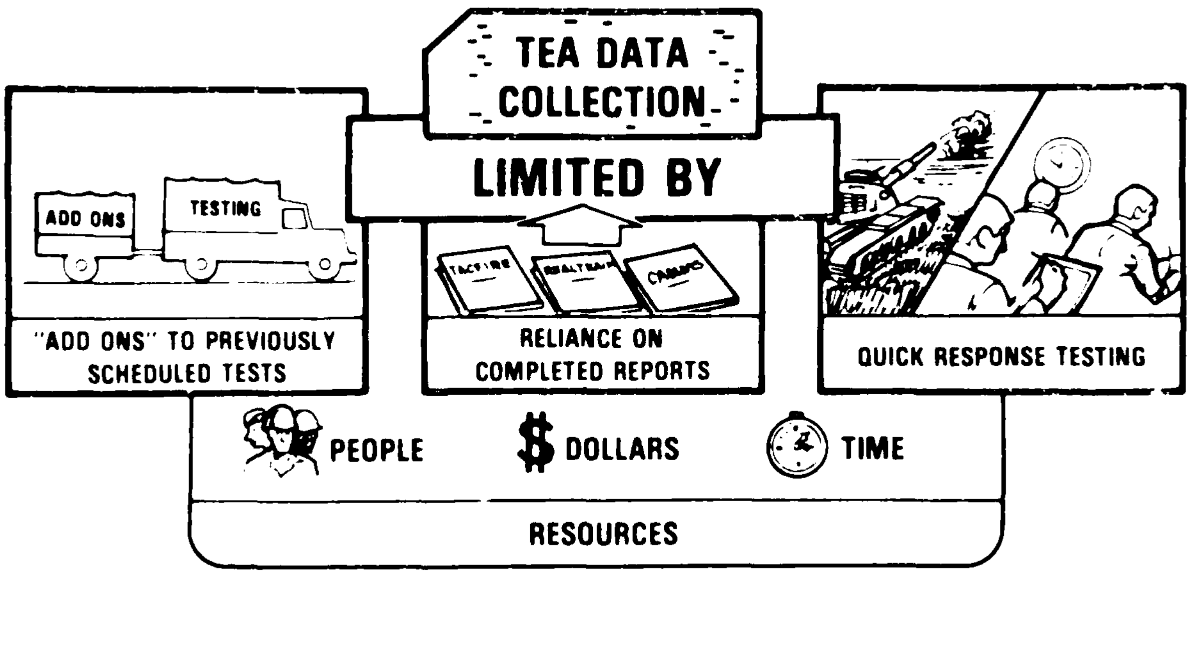
In addition to supporting the BTM, future TEA results will be used to improve TEA methodology, training techniques, and training programs.

f. Development of methodology for TEA '85. Lessons learned in the development of TEA were applied to the TEA '85 program. This program is designed to ensure the timely effective assimilation of new weapon systems, equipment, and MOS into the Army. TEA '85 is discussed in the basic document as well as in Annex B, TEA '85. Many concepts in TEA '85 grew out of TEA '78. It was quickly seen that trainability must be ensured prior to the making of a production decision and that adequate

training subsystems must be provided apace with procurement if the potential inherent in modernization of the Army is to be realized. As ARTS progressed, it became clear that certain objectives applied to all tests. These objectives, termed core objectives, were developed as a result of deliberate consideration of the challenge of obtaining data so that training to an optimal level of proficiency could be accomplished. The core objectives and accompanying situational variables which were developed to be used in various combinations with selected tests, became the basis for the TEA '85 methodology. A comprehensive TEA '85 test plan which included tests directed at developing systems as well as resource component and training base related problems was prepared.

g. TEA '78 Management System. This system is discussed in the basic document as well as in paragraph 3a of this Annex. The TEA '78 Management System is at Appendix 1. It is sufficient to say here that TEA '85 core objectives and selected situations variables were factored into TEA '78 by use of the management system.

h. Synoposis of test results (See Appendix 2).



TEA '78 TESTS

The program included testing on the following pacing systems and MOS. Tests provided data across the ARTS Model from resources to combat effectiveness. Synopses of these tests are at Inclosure 2. Tests from this series that have not been completed have been transferred to TEA '79.

a. M60A1 tests were conducted by the Armor Center, TRASANA, and ARI, and were sponsored by the Armor Center SWT. A comprehensive series of tests were planned and conducted which included research into the effects of turbulence, proficiency, and retention; the relationship of institutional training for entry level personnel on unit proficiency; rapid train-up programs for reserve units and the application of ARTS TEA '85 concepts to the XM1 OT II. Reserve Component and tank subcaliber tests have been transferred to TEA '79.

b. Extensive Redeye testing was conducted to determine costs, appropriate training programs, performance decay over time, and to define interoperability impacts of US programs in other nations. In addition, TEA '85 core and situational variables concerning learning decay, varying the institutional and unit training mix, the effects of turbulence, and development of exportable training packages for reserve units were investigated. A methodology to input variable levels of proficiency into the COMO III war model to determine combat effectiveness (CE) as a function of training was also developed.

c. A series of ongoing and scheduled TOW TEA tests being conducted for and by the Infantry school were incorporated into TEA '78 to determine the cost to train in the institution; the cost to train Active and Reserve Component TOW crews and the cost to implement improved TOW vehicle (ITV) training. Additional subtasks were planned to compare institutional and unit training alternatives and to correlate TOW trainer scores with live fire scores and gunner selection criteria models. TRASANA supported the Infantry School in relating gunner proficiency levels to combat effectiveness by use of war models. While these tests have been largely concluded, final reports have yet to be approved. For this reason, this series of tests has been transferred to TEA '79.

d. Testing of forward observers (FO) included research into the relation between the FO and unit training programs; the impact of expanded use of the observed fire trainer on FO proficiency, and the suitability of exported FO training. These tests are still ongoing and have been transferred to TEA '79.

e. Tests of 63C/H personnel included the development of proficiency profiles from entry level training through grade E-7 to include performance decay curves. Reserve Component training programs were also investigated.

f. Tests of 05C personnel evaluated the effectiveness of the self-paced program. A proficiency comparison was made of 05C teams in units which had been trained in self-paced and in group trained courses. Alternative unit training programs were compared to determine optimum programs to correct performance deficiencies.

Add-on-Testing

As a part of the TEA upgrading effort, a concentrated effort was made to incorporate data from ongoing tests into TEA '78. Data have been received from Rifle Squad REALTRAIN, Anti-Armor REALTRAIN, and Computer Assisted Map Maneuver (CAMMS) testing designed to generate proficiency profiles on command groups. Other tests from which data will be received in the future as part of the TEA '79 program include the training instrumentation evaluation (TIE) test, ARI studies on cannon crew turnover and tests on the retention and proficiency of common Field Artillery AIT skills, and TACFIRE OT III.

TEA '78 testing included the collection of biographical data, history of institutional and unit training, and the specific costs of this training. In addition, concerted efforts were made to determine skill retention. Research of available literature was integral to all tests. Test objectives were designed to establish correlations between selected variables and job performance (i.e. hits as a function of stability, performance as a function of experience or turbulence, etc.).

Appendix:

1. TEA '78 Management System Package

2. Test Synopses

Appendix 1 to Annex A

ARMY TRAINING STUDY

TRAINING EFFECTIVENESS ANALYSIS 1978

DEPARTMENT OF THE ARMY
HEADQUARTERS US ARMY TRAINING STUDY
FORT BELVOIR, VIRGINIA 22060

ATCG-ATS 10 April 1978

SUBJECT: Revised Army Training Study (ARTS) TEA 78 Management System Package

SEE DISTRIBUTION

1. References:

a. Training Developments Study Directive: Army Training Study (ARTS), dated 6 Oct 1977.

b. Director, ARTS Letter of Transmittal, TEA 85, dated 13 Jan 1978.

c. Director, ARTS Letter: Army Training Study (ARTS) TEA 78 Management System, dated 5 April 1978.

2. At Inclosure 1 is the revised ARTS TEA 78 Management System Package. This package reflects the changes that were made in reference c as a result of visits of ARTS staff members to TRADOC proponent schools.

3. At Inclosure 2 is a summary of all changes as coordinated with and agreed to by the TRADOC proponent schools. Corrections have been made to include changes proposed for each test.

4. ARTS will devote increased study effort to analysis of evidence that can be derived from test activities in TEA 78. Validity of the TEA 78 test results is essential to the evolution of the Battalion Training Model. ARTS will drive hard to assist both testers and supporting test units in ensuring a quality effort. We solicit the active, aggressive support of systems work team members, analysts, testers, testees and the multitude of people, soldiers and civilians alike who have already contributed so much to ARTS.

ATCG-ATS 10 April 1978

SUBJECT: Revised Army Training Study (ARTS) TEA 78 Management System Package

5. Questions concerning any aspect of this package should be referred to ARTS staff. POC: LTC Bloedorn and LTC Stone, Autovon 354-1461/1462/1463/1464.

FREDERIC J. BROWN
BG, USA
Director

2 Incl
1. Revised TEA 78 Mgt Sys Package
2. MFR: TEA 78 Tests

DISTRIBUTION:
2-Ea SAG Attendee
1-Ea TEA Consultant Gp Mbr
1-Ea Ed/Tng Consultant Gp Mbr
1-Ea Cost/Res Mgt Consultant Gp Mbr
1-Ea SWT
1-Ea ARTS LNO

ATCG-ATS 5 April 1978

SUBJECT: ARMY TRAINING STUDY (ARTS) TEA '78 MANAGEMENT SYSTEM

1. REFERENCES:

a. Training Developments Study Directive: Army Training Study (ARTS) dtd 6 Oct 1977.

b. Director, ARTS Letter of Transmittal, TEA '85, dtd 13 Jan 1978.

2. The purpose of this memorandum is to describe the ARTS system of managing the near-term study effort, Training Effectiveness Analysis (TEA) '78. This management system is designed to:

a. Coordinate TEA '78 field testing and research with other ongoing Army tests so that meaningful data from all tests will be available to ARTS analysts.

b. Provide a common report format which will facilitate analysis of the entire short term study effort in terms of the ARTS model, essential elements of analysis and the long term study, TEA '85.

c. Provide a "crosswalk" between TEA '78 objectives and test activities and the core objectives and situational variables of the long term study, TEA '85.

3. TEA '78 combined with the long term effort, TEA '85, form a TEA program which has been designed to quantify the current training system in order to justify allocation of required training resources. Additionally, this program should develop insights leading to training system improvements designed to provide an Army trained to win not just the first but rather all battles of the next war.

4. Concept: The TEA '78 management system provides:

a. A summary listing of all tests currently included in TEA '78 and additional tests that appear to provide information which will upgrade/validate data gathered in TEA '78 tests.

b. Work sheets for each system work team(SWT). These work sheets outline test objectives, sample sizes, links to the ARTS model, major test activities and scheduled reporting dates. The work sheets are designed to facilitate action officer coordination of ARTS-related efforts. They can also be used to trace the progress of field testing of those add-on tests which can be used in conjunction with SWT Study Plans. Recommendations concerning other ongoing tests which might support ARTS objectives are solicited. Work sheets are at

Inclosure 1.

c. TEA '78 ARTS Deliverable Summary Sheet. Attached to each test work sheet is a deliverable summary sheet which portrays the separate test activities in relation to various areas of training interest, i.e., training in the institution (T_I), individual training in the unit largely to Soldier's Manual tasks (T_S) or collective training in the unit, primarily to ARTEP tasks (T_A). These activities are also arrayed to portray their interface with TEA '85 core objectives and situational variables. Used in conjuction with reference 1b, these test activities are to be used in transition to testing designed to support long term study efforts. Further, the Deliverable Summary Sheet portrays the TEA '78 interface with ongoing ARTS efforts. Deliverable Summary Sheets are attached to work sheets at Inclosure 1.

d. The reporting handbook attached at Inclosure 2 has been prepared to assist in arraying test data results and conclusions by ARTS area of interest within the ARTS model. Further, the handbook provides guidance to ensure that data is delivered in such a manner that it is readily available to TEA '85 testers and those ARTS personnel developing the Battalion Training Model.

e. ARTS Training Resource Methodology, attached at Inclosure 3, will continue to be a guideline for the collection of resource data for the development of insights concerning the relationships between resources and training conducted both in the institution and in the unit.

4. At Inclosure 4 is an extract of the TEA '85 program, reference 1b, showing the core objectives, situational variables, test concepts and the TEA '85 master test plan. This extract should be used in conjunction with the TEA '78 independent evaluation plans to ensure that data deriving from TEA '78 test activities which will be needed for execution of TEA '85 and other study efforts (Battalion Training Model) is captured and included in all reports to ARTS.

5. ARTS POC are visiting each SWT to:

a. Review work plans and progress.

b. Assist in arranging technical support as appropriate.

c. Discuss report guidelines to identify necessary changes to the final procedures described in the reporting handbook (Inclosure 2). These guidelines encompass how tests will relate to the ARTS Model, objectives, EEA, and situational variables, and subsequent ARTS excursions.

6. ARTS POC's for the administration of this system are:

a. LTC G. W. Bloedorn & LTC T. Stone AV 354-1461/62/63
M60A1
MOS 63/C, H
CAMMS
XM-1 OT II
REALTRAIN
TIE TEST
GENERAL SURVEY ON TRAINING REQUIREMENTS

b. LTC P. Zielenski AV 354-1461/62/63/64
ARTY FO 13 F Exported Tng
ARI CANNON CREW Turn-over
TACFIRE Post OT III
REDEYE
AIT COMMON SKILLS RETENTION - 13B

c. LTC W. Valen AV 354-1461/62/63/64
TOW
11B P4
O5C

F J Brown

FREDERIC J. BROWN
BG, USA
Director

4 Incl.
1. SWT Worksheets and ARTS Deliverable Summary Sheets
2. Reporting Handbook
3. ARTS Training Resource Methodology
4. TEA '85 Extract

SWT WORKSHEETS AND ARTS

DELIVERABLE SUMMARY SHEETS

ANNEXES:

A. M60A1

B. REDEYE

C. TOW

D. FO

E. 63C/H

F. 05C/F

G. ADD-ON TESTS

INCL 1

ARMY TRAINING EFFECTIVENESS ANALYSIS 1978 TEST PROGRAM (SHORT TITLE: TEA 78)

WT	TEST/STUDY TITLE	TRADOC SCHOOL ANALYTICAL AGENCY	SAMPLE SIZES	TEST UNITS	LINKS TO ARTS MODEL	LINKS TO TEA 85 CORE & SITUATIONAL VARIABLES	TEST DATES & MAJOR ACTIVITIES	INTERIM/FINAL REPORT DATE	REMARKS
M60A1	TANK CREW TURBULENCE RESEARCH	USAARMS/ARI	1 TK BN 1 SEP TK CO.	2 BN, 34 ARM CDEC TK CO	PROG TO PROP	CORE: A&B VAR: 12, 16&25	TABLE VIII 13-24 MAR 78. NON-11E TRAIN-UP 29 MAR TO 6 APR 78. CDEC TEST 15-25 MAY 78.	I-10 MAY P-DRAFT BY 10 JUN	FINAL RPT SUBJ TO ARI APPROVAL
M60A1	PROFICIENCY & RETENTION TESTS	USAARMS/ARI	1000 BAT TESTEES 200-300 UNIT TROOPS	24ID, 3AD	RES TO PROP PROG TO PROP	CORE: B, C&D VAR: 3&18	28-29 MAR FT STEWART 17-20 APR USAREUR	I-7 APR P-7 MAY	
M60A1	MODULAR TRAINING FOR R.C.	USAARMS/ARI	90 TK CREWS	49AD (ARNG)	PROG TO PROP RES TO PROP	CORE: A, B, VAR: 3, 19&25	49AD READINESS TEST 3-18 JUN. BN TRAIN-UP DURING FY79. 49AD READINESS TEST JUN 79	I-UNKNOWN P-UNKNOWN	
M60A1	MODIFIED M60A1 WSTEA	USAARMS/TRASANA	400 TK CREWS	4ID, 3ID	PROG TO PROP (INPUT FOR WAR MDL) PROP TO CE	CORE: A, B VAR: 16, 17 18&25	4ID 16 JAN-5 JUN 78 3ID 11 FEB-15 MAR 78	I-N/A P-1 JUL	
M60A1	SCALED RANGE SUB CALIBER TEST	USAARMS/USATCA	400 BAT TESTEES	194 AR BDE USATCA 1 TNG BDE	RES TO PROP	CORE: B VAR: 3, 18 20&25	FIRE TABLE I-VIIC 15 MAY-AUG 78 15 MAY 12 JUN	I-PHASE 1 30 AUG P-T+180 DAYS EST 9 NOV	
M60A1	TRAINING TIME RATIO	USAARMS/ARTS	1 BDE SIZE (3-4 BN) SAMPLE OF CMDRS & TNG STAFF	4ID	PROG TO PROP	CORE: A VAR: 3&11	1-2 DAY SEMINAR USAARMS/ARTS/4ID LATE APR 78	I-31 MAY P-1 JUL	
M60A1	XM1 OT II	USAARMS/OTEA	1 XM1 PLT 1 M60A1 PLT 2 AGGRESSOR TK PLTS	FT BLISS, TX UNITS TBD	RES TO PROP PROG TO PROP	CORE: A, B, C&D VAR: 2, 13&24	OT II MAY-DEC 78	I-EST 1 FEB 79 F-EST 1 MAR 79	

ARMY TRAINING EFFECTIVENESS ANALYSIS 1978 TEST PROGRAM (SHORT TITLE: TEA 78)

SWT	TEST/STUDY TITLE	TRADOC SCHOOL ANALYTICAL AGENCY	SAMPLE SIZES	TEST UNITS	LINKS TO ARTS MODEL	LINKS TO TEA 85 CORE & SITUATIONAL VARIABLES	TEST DATES & MAJOR ACTIVITIES	INTERIM/FINAL REPORT DATE	REMARKS
RED-EYE	REDEYE ENGAGEMENT TEST	USAADS/TRASANA	AIT: 120 TROOPS UNIT: 25-150/ UNIT RC: 25/UNIT	FORSCOM USAREUR OTHER (SEE WORK SHEET)	RES TO CE	CORE: A, B&D VAR: 3, 16, 18, 19, 20&25	20 MAR-7 JUL-FORSCOM 24 APR-19 MAY-USAREUR 15-19 MAY-KOREA (SEE WORK SHEET)	I-N/A F- DRAFT 1 JUL	
TOW	INSTITUTIONAL TRAINING FOR 11H	USAIS/USAIS	6 INF BNS 1 TLAT BN	4ID, 9ID TLAT BN (ARNG)	RES TO PROG TO PROF	CORE: B VAR: 3&12	DATA GATHERING 17 FEB-30 APR	I-15 JUN F-20 JUL	
TOW	COMPARISON OF INSTIT TOW TRAINING VS UNIT TOW TRAINING	USAIS/USAIS	6 INF BNS 1 TLAT BN P4 CRS STU-DENTS	4ID, 9ID TLAT BN (ARNG)	RES TO PROG TO PROF	CORE: B VAR: 3,5&12	DATA GATHERING 1 FEB-30 APR	I-15 JUN F-20 JUL	
TOW	UNIT PROFICIENCY MAIN-TENANCE AND ITV TRAINING	USAIS/USAIS	6 INF BNS 1 TLAT BN	4ID, 9ID TLAT BN (ARNG)	RES TO PROG TO PROF	CORE: B VAR: 3&12	DATA GATHERING 1 FEB-30 APR	I-15 JUN F-20 JUL	
TOW	TOW/ITV TRAINING WEAKNES-SES (STUDY)	USAIS/USAIS	6 INF BNS 1 TLAT BN P4 CRS STU-DENTS	4ID, 9ID TLAT BN (ARNG)	RES TO PROG TO PROF	CORE: B VAR: 3	DATA GATHERING 1 FEB-30 APR	I-15 JUN F-20 JUL	
TOW	TOW TEA TEST	USAIS/TCATA	3 GROUPS OF 90 TROOPS EACH TOTAL 270	2AD	PROG TO PROF AND THROUGH WAR MDL TO CE	CORE: A VAR: 3, 12, 18, 19&25	13 MAR-20 APR	I-15 JUN F-20 JUL	
TOW	WAR GAME MODEL-RELATE LEVELS OF TOW PROF TO CE	USAIS/TRASANA	DATA FROM TOW TEA PLUS 13 TOW CREWS	197 INF BDE	PROF THROUGH WAR MDL TO CE	CORE: A VAR: 18	DATA GATHERING 13 MAR-20 APR	I-30 JUN F-20 JUL	

ARNG TRAINING EFFECTIVENESS ANALYSIS 1978 TEST PROGRAM (SHORT TITLE: TEA 78)

SMT	TEST/STUDY TITLE	TRADOC SCHOOL ANALYTICAL AGENCY	SAMPLE SIZES	TEST UNITS	LINKS TO ARTS MODEL	LINKS TO TEA 85 CORE & SITUATIONAL VARIABLES	TEST DATES & MAJOR ACTIVITIES	INTERIM/FINAL REPORT DATE	REMARKS
TOW	TOW GUNNER SELECTION CRITERIA (COMPARATIVE STUDY)	USAIS/ARI	RUN WITH TOW TEA 3 GROUPS OF 90 TROOPS EACH TOTAL 270	2AD	PROG TO PROF	VAR: 18&19	MODEL VALIDATED BY LIVE FIRE TOW TEA 13 MAR-20 APR	I-15 JUN F-20 JUL	
TOW	TLAT BN (ARNG) INSIGHTS ON RESERVE COMPONENT UNIQUE PROBLEMS AND INFORMAL EVALUATION OF TEC LESSONS	USAIS/USAIS	1 TLAT BN	TLAT BN (ARNG)	RES TO PROG TO PROF	CORE: B VAR: 12, 19&25	DATA GATHERING 1 FEB-30 APR	I-15 JUN F-20 JUL	
TOW	DIVISION RESTRUCTURING STUDY	USAIS/TCATA	3 INF BNS	1CAV	RES TO PROG TO PROF	CORE: A, B VAR: 19	PHASE 1 ENDED FEB 78 PHASE 2 SPRING 78	I-15 JUN F-20 JUL	
TOW	ITV OT III	USAIS/OTEA	1 MECH INF CO 1 CAV PLT	9ID	RES TO PROG TO PROF	CORE: A, C, D VAR: 12	15 JAN-30 APR	I-15 JUN F-20 JUL	
TOW	ITV CTEA STUDY	USAIS/USAIS	DATA FROM ITV OT III	STUDY	RES TO PROG TO PROF	CORE: B VAR: 3, 20&25	15 JAN-30 APR	I-15 JUN F-20 JUL	
TOW	TOW COSTING METHODOLOGY	USAIS/USAIS	9 INF BNS 1 TLAT BN	4ID 9ID 1CAV TLAT BN (ARNG)	RES TO PROG TO PROF	CORE: B VAR: 3	DATA GATHERING 1 FEB-30 APR	I-15 JUN F-20 JUL	
FO	FO/UNIT TNG TEST	USAFAS/TRASANA	144 TROOPS	4ID 2AD 1CAV	PROG TO PROF	CORE: A, B&C VAR: 16&17	DATES: TBD	I-1 JUL F-1 OCT	

ARMY TRAINING EFFECTIVENESS ANALYSIS 1978 TEST PROGRAM (SHORT TITLE: TEA 78)

SWT	TEST/STUDY TITLE	TRADOC SCHOOL ANALYTICAL AGENCY	SAMPLE SIZES	TEST UNITS	LINKS TO ARTS MODEL	LINKS TO TEA 85 CORE & SITUATIONAL VARIABLES	TEST DATES & MAJOR ACTIVITIES	INTERIM/FINAL REPORT DATE	REMARKS
FO	OBS FIRE TNG CTEA EXPANSION	USAFAS/TRASANA	393 TROOPS	4ID 9ID 2AD 1CAV, III CORPS, FT KNOX	PROG TO PROF	CORE: B VAR: 20&25	DATES: TBD	I-1 JUL F-1 DEC	
FO	SUITABILITY OF 13F EXPORT TRAINING	USAFAS/TRASANA	ANALYSIS OFT CTEA EXPANSION	NONE	INDIV TNG	CORE: A, B&C VAR: 3, 5, 12&15	ANALYSIS	I-15 DEC F-15 FEB 79	
63C/H	CONFIRM SQT AS A MEASURE OF PROFICIENCY	USAOCCS	APPROX 475 TROOPS E2-E4, APPROX 120 TROOPS E-5 AND ABOVE	1ID 4ID 5ID 49AD (ARNG) 8ID	PROG TO PROF	CORE: A VAR: 12&18	8ID 24-27 APR 1ID 8-11 MAY 4ID 6-10 MAR 5ID 21-25 FEB 49AD (ARNG) 12-15 JAN (FT HOOD, TX)	I-N/A F-AUG	ADMINISTRATION OF SQT TEST ORIGINALLY PLANNED FOR MAR-MAY HAS BEEN RESCHEDULED BY DA TO MAY-JUL. COMPUTER PROCESSING WILL ADD A MINIMUM OF 6-8 WEEKS
63C/H	IDENTIFY PROFICIENCY DEVELOPMENT PROFILES				PROG TO PROF	CORE: B, C&D VAR: 3, 12&18		I-APR-MAY* F-JUN *DATA SUMMARIES WILL BE PROVIDED AS COMPLETED	
63C/H	IDENTIFY COST EFFECTIVENESS OF INSTITUTIONAL AND UNIT TRAINING PROGRAMS				PROG TO PROF	CORE: B VAR: 5, 12&16	N/A* *DATA FROM 63C/H TESTS WILL BE INCLUDED IN MATERIALS STUDIED.	I-APR-MAY* F-15 JUN *DATA SUMMARIES WILL BE PROVIDED AS COMPLETED	
63C/H	IDENTIFY OPTIMUM DISTRIBUTION OF INDIVIDUAL TRAINING BETWEEN INSTITUTION AND UNITS				PROF TO CE (THEORETICAL LINK)	VAR: 3, 5, 18&20	N/A	I-APR-MAY* F-15 JUN *DATA SUMMARIES AVAILABLE	

ARMY TRAINING EFFECTIVENESS ANALYSIS 1978 TEST PROGRAM (SHORT TITLE: TEA 78)

SWT	TEST/STUDY TITLE	TRADOC SCHOOL ANALYTICAL AGENCY	SAMPLE SIZES	TEST UNITS	LINKS TO ARTS MODEL	LINKS TO TEA 85 CORE & SITUATIONAL VARIABLES	TEST DATES & MAJOR ACTIVITIES	INTERIM/FINAL REPORT DATE	REMARKS
63C/E	IDENTIFY ALTERNATIVES FOR TRAINING SELECTED PERSONNEL FOR MOBILIZATION		N/A	N/A	PROG TO PROP	VAR: 18&19	N/A	I-N/A F-15 JUN	
05C/F	COMPARE TASK PERFORMANCE OF SELF PACED AND GROUP PACED GRADUATES	USASIGS/ USASIGS	PART 1 224 TROOPS PART 2 ALL 05C/F SELF PACED GRADS 15 APR-30 JUN & ALL 05C/F OSUT GRADS 1 JUL-15 SEP	USASIGS STUDENTS	RES TO PROP	CORE: B	ALL TESTING DONE AT USASIGS. PART 1 COMPLETED. PART 2 15 APR-30 JUN, 1 JUL-15 SEP	I-PART 1 1 APR PART 2 1 JUL F-PART 1 1 APR PART 2 15 SEP	
05C/F	TEST PROFICIENCY OF 05C/F TEAMS IN FIELD UNITS	USASIGS/ USASIGS	230 TROOPS	24ID 1AD 49AD (ARNG)	RES TO PROP	CORE: C VAR: 12&18	24ID TBD PROB MAY; 49AD (ARNG) 5-9 JUN, 12-15 JUN; 1AD TBD	I-MID JUN 78 F-1 JUL	
05C/F	COMPARE ALTERNATIVE UNIT TRAINING PROGRAMS	USASIGS/ USASIGS	SELECTED TROOPS OF THE 230 TESTED ABOVE. SPECIFIC NUMBER NOT AVAILABLE	24ID 1AD 49AD (ARNG)	RES TO TNG PROG TO PROP	CORE: A&B VAR: 12, 16&19	ADMINISTERED AFTER COMPLETION OF ABOVE TESTING OF 05C/F IN FIELD UNITS, 24ID TBD PROB LATE MAY-JUNE. 49AD MID JUN. 1AD TBD	I-3 JUL F-TBD	
ADD-ON	RIFLE SQUAD REALTRAIN	USAIS/ARI	SIX RIFLE SQDS	N/A	PROG TO PROP	TBD SUBSEQUENT TO STUDY OF REPORT	11 APR-28 MAY 77	I-N/A F-ARI FIELD REPORT 11-92 DTD OCT 77	THIS IS AN ARI RESEARCH PROJECT
ADD-ON	ANTI-ARMOR REALTRAIN	ARI	ONE TK BN ONE MECH BN 6 FIST TM	4ID	PROG TO PROP	CORE: A, B, C&D VAR: 18, 20&25	JAN-MAR AT FT CARSON	I-EST 24 MAR F- EST 15 JUN	

ARMY TRAINING EFFECTIVENESS ANALYSIS 1979 TEST PROGRAM [illegible] TITLE TEA 28)

	TEST STUDY TITLE	TRADOC SCHOOL ANALYTICAL AGENCY	SAMPLE SIZES	TEST UNITS	LINKS TO ARTS MODEL	LINKS TO TEA 85 CORE & SITUATIONAL VARIABLES	TEST DATES & MAJOR ACTIVITIES	INTERIM-FINAL REPORT DATE	REMARKS
ADD-ON	COMPUTER ASSISTED MAP MANEUVER (CAMMS)	CAC/CATRADA	5 BN COMMAND GROUPS	2-110 3-410	PROG TO PROP	CORE: A, B, C, D&E VAR: 16, 17, 19, 20&25	SCHEDULE OF BN TNG SESSION TBD	I-15 MAY F-1 JUL	PHASE I # TEA [illegible] COMPONENT TESTS
ADD-ON	TRAINING INSTRUMENTATION EVALUATION (TIE) TEST	TRADOC-DCST-/ CDEC	ARM HVY CO TM	CDEC FORSCOM UNIT TBD	PROG TO PROP	CORE: A&B VAR: 16, 17&25	PHASE I 31 JUL-26 AUG PHASE II 1 SEP-15 SEP	I-N/A F-EST 15 DEC	
ADD-ON	CANNON CREW TURNOVER (ADD-ON)	USAFAS/ARI	VAL: 8 HOW SECT TEST: 36 HOW SECT	III CORPS ARTY, 910 (PENDING)	EFFECT OF TURBULENCE	CORE: C VAR: 16	VAL TRIAL 17 MAR. FT SILL. AUG FT LEWIS.	I-TBD F-TBD	
ADD-ON	TACFIRE POST OT III (ADD-ON)	USAFAS/ARI, FT HOOD	1 TACFIRE SYSTEM W/CREW	1CAV	PROG TO PROP	CORE: C&D VAR: 16	17 APR-JUL FT HOOD	I-JUL F-TBD	EMPHASIS ON LEARNING, DECAY & RETRAIN
ADD-ON	RETENTION & PROFICIENCY OF COMMON AIT SKILLS	ARI	500 TROOPS	III CORPS ARTY	PROG TO PROP	CORE: A,C&D VAR: 3	APR-MAY	I-1 JUL F-TBD	THIS IS AN ARI TEST

10 Apr 78

WORKSHEET

TITLE: M60A1 - TANK CREW TURBULENCE RESEARCH SCHOOL/AGENCY: USAARMC/FT KNOX ARI POC/PHONE: COL R. Maxham AV 464-3546
Dr. Ken Eaton AV 464-3450

1. OBJECTIVES	2. SAMPLE SIZE	3. TEST UNIT (S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/ FINAL REPORT DATE
1. To measure the effect of crew turbulence upon tank gunnery performance.	1. 45 crews (324 crews)	2d Bn 34th ARM (1AD 1977)	1. Tank crew stability questionnaire. (Includes all 1AD crews)	Table VIII 13-24 Mar	T_S, T_{S2}	1. Effects of turbulence on proficiency.	I-Analysis of turbulence by 10 Jun F-10 May
2. To validate the effects of modular training on AC non-MOS qualified non-proficient ARM crews.	2. 11 Tank Crews w/non-11E gunner loaders (22EM).		2. Demographic questionnaire. (AIR)	Gnr/ldr replacement (71L Tanker) train-up 29 Mar - 6 Apr 71L Tanker Gunnery 31 Mar - 8 Apr	T_A, T_{A2}	2. PROG to PROF	F-Draft 1 Jul
3. To validate the effects of modular training on AC MOS qualified non-proficient ARM Crews.	3. 17 Tank Crews (68 off/ EM)	USACDEC	3. Tank table VII, VIII scores.	CDEC Test EPT 15-25 May			F- 1. Turbulence Report 10 Jun 2. Demographics (AIR) 1 Jul 3. Train-up 11E 1 Jul 4. HumRRO Costs to Proficieny 1 Jul

DELIVERABLE SUMMARY

TEST ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
$T_{I\&S}$ 1. Administer tank crew stability questionnaire to each tank crewman. T_S 2. Orient/train-up 71L Tanker w/qualified IL a Drvr.	Variable 16: Determine effects of stability and turbulence.	To be used to adjust heuristic data on tank crew skills for armor bn. (95% battlefield data effort) 1. Determine frequency of retrain of tank crew SM skills as a function of different levels of turbulence extrapolated to company level.
T_{S2} 1. Conduct modular train-up for 71L Tanker. 2. Conduct modular train-up for 11E Tanker.	Core A: Continue validation of threat oriented SM/ARTEPs. Core B: Determine time/costs to achieve proficiency.	2. Determine proficiency to SM level as function of turbulence. 3. Determine time to train and retrain to SM skill level for existing turbulence level. 4. To what other systems would this data apply?
T_A 1. Fire Table VIII w/normal crews. 2. Fire Table VIII w/scrambled crews.	Variable 16: Determine effects of stability and turbulence. Variable 12: Determine exportable training packages to support training.	5. To what other tasks within same system does data apply? 6. How much time and how many dollars are saved for train (71L) and retrain (11E) using modular train up packages?
T_{A2} 1. Fire Table VIII w/71L Tanker Gnr/Ldr. 2. Fire Table VIII w/11E modular trained crews (Painter Liggett, CA)	Variable 25: Validate the effectiveness and efficiency of training devices.	7. What is proficiency delta as function of modular training programs?

10 Apr 78

WORKSHEET

TITLE MODAL PROFICIENCY & RETENTION OF BASIC ARMOR SKILLS SCHOOL/AGENCY: USAARMC/1 TNG BDE W/ARI POC/PHONE: COL R. B. Maxham - AV 464-3546

1. OBJECTIVE(S)	2. SAMPLE SIZE	3. TEST UNIT(S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/FINAL REPORT DATE
1. Measure proficiency of BAT 11E on Midcycle & TSQT.	1000 trainees	USATC 1st Tng Bde, 2AID, 3AD	1. Biographical data.	28-29 Mar	T_I, T_S	1. PROG to PROF (T_I & T_S)	
2. Measure individual retention of basic ARM skills in institution & units.	200-300 trainees		2. Records of tng of indiv in unit.	17-20 Apr		2. RES to PROF	I-Mid-Apr F-Mid-Jun
3. Document time & resources dedicated to training & types of training administered from date of assignment to unit to retest date.	200-300 trainees		3. Mid-cycle & TSQT scores.				
4. Examine relationship of unit tng to skill retention.	200-300 trainees		4. Indiv tng experience survey.				
5. Examine relationship of demographic variables to proficiency & retention.	200-300 trainees		5. Supervisor's tng experience survey.				

	ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
T_I & T_S	1. Measure proficiency attained by BAT in institution. 2. Document costs of training in institution.	Core B: Determine time/costs to achieve proficiency. Core C: Develop diagnostic tests to measure proficiency and decay levels. Core D: Determine decay rates and frequency of required retraining. Variable 3: Determine allocation of tasks between instit/unit. Variable 18: Determine effects of less capable trainees.	1. Determine time/costs to train to 95% proficiency on tank crew SM tasks. 2. Determine frequency/costs of re-train. 3. Validate 1 & 2 above with Table VIII results. 4. To what other systems does this data apply? 5. Determine time/costs/proficiency of training to 95% proficiency as a function of Selection Criteria scores (capability of trainees).
T_{S2}			
T_A	1. Document time & resources dedicated to training & types of training administered in unit.	Variable 18: Determine effects of less capable trainees.	
T_{A2}			

10 Apr 78

WORKSHEET

ARI: DR. Don Haggard AV 464-3450

TITLE M60A1 MODULAR TRAINING FOR RESERVE COMPONENTS SCHOOL/AGENCY: USAARMS/ARI POC/PHONE: COL R. Maxham AV 464-3546

1. OBJECTIVES	2. SAMPLE SIZE	3. TEST UNIT (S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/ FINAL REPORT DATE
1. Determine proficiency acquired by ARNG ARM crewmen using modular training packets vs. current RC training methods.	90 ARNG TK crews of three TK Bns.	49AD (ARNG)	1. Survey of trainers & students.	Readiness Test 3-18 Jun	T_{S1}, T_{S2}	1. RES to PROF.	I-EST 31 Aug F-30 Sep 79
2. Document cost data associated w/each training packet (module).			2. Resource sheets from units.	Modular train-up for Bns during FY79 followed by readiness test of conventional training vs modular training	T_{A1}, T_{A2}	2. Relationship of T_S to T_A in RC.	
3. Validate training modules by comparing Readiness Test proficiency in FY78 w/comparable proficiency in FY79.			3. Scores from readiness tests before & after training.			3. RES to PROF for RC.	
			4. Table VIIC scores FY78, FY79.			4. RES to T_{S2} & T_{A2} in RC.	

	TEST ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/ ATTRITION TRAINING MODEL
T_I & T_S	1. Readiness Test 3-18 Jun. 2. Readiness Test Jun '79.	Core A: Continue validation of threat oriented SM/ARTEPs. Variable 3: Determine allocation of tasks between instit/unit.	1. Validate against tank crew turbulence test data. . Time/costs to individual proficiency. . Time /costs to collective proficiency. 2. Determine most cost/time effective program to achieve collective proficiency of RC Bn.
T_{S2}	1. Document cost data associated w/each Training Packet (Module). 2. Validate Training Modules by comparing readiness test scores FY78 w/FY79.	Core B: Determine time/costs to achieve proficiency.	
T_A	1. Readiness Test 3-18 Jun. 2. Readiness Test Jun '79.	Core A: Continue validation of threat oriented SM/ARTEPs. Variable 3: Determine allocation of tasks between instit/unit. Variable 19: Evaluate rapid refresher training programs.	
T_{A2}	1. Document cost data associated w/each Training Packet (Module). 2. Validate Training Modules by comparing readiness test scores FY78 w/FY79.	Core B: Determine time/costs to achieve proficiency. Variable 25: Validate the effectiveness and efficiency of training devices.	

10 Apr 78

WORKSHEET

TITLE: M60A1 MODIFIED M60A1 WSTEA (PARAMETRIC ANALYSIS OF CREW)

SCHOOL/AGENCY: USAARMS/TRASANA

POC/PHONE: COL R. Maxham, USAARMS AV 464-3546
Mr. Ron Cooper, TRASANA AV 256-1494

1. OBJECTIVE(S)	2. SAMPLE SIZE	3. TEST UNIT(S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/FINAL REPORT DATE
1. Determine crew gunnery proficiency represented by Table VIII firing scores.	200 crews	4ID	1. Demographic data.	16 Jan-5 Jun	T_{S1}, T_{S2}	1. PROG to PROF	I-N/A F-1 Jul
2. Identify relationship between gunnery scores and combat effectiveness (war models).	200 crews 400 crews TOTAL	3ID	2. Training history.	11 Feb-15 Mar	T_{A1}, T_{A2}	2. Input to war mdl, i.e., PROF to CE.	
3. Assess level, type & source of training that produced proficiency.			3. Attitude surveys.			3. Link between PROG & PROF	
4. Determine correlation between personal history and training and proficiency with following: - effectiveness baseline for training analysis. - identify significant variables influencing crew proficiency.						4. PROF to CE	
5. To relate different gunner proficiency levels to CE through war model (TRASANA effort with CARMONETTE, possibly with BATTLE).							

	TES ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
T_I & T_S	1. Determine training history of individual. 2. Identify significant variables influencing crew proficiency such as background, physical characteristics, stability, training, and leadership.	Variable 16: Determine effects of stability and turbulence. Variable 18: Determine effects of less capable trainees. Variable 17: Determine effects of reduced off/NCO fill.	1. Determine SM proficiency as function of varying levels of turbulence extrapolated to company level. 2. Determine SM proficiency as a function of officer/NCO fill and availability for training. 3. Determine time/frequency/costs of SM tasks as a function of turbulence & officer/NCO fill. 4. Determine time/frequency/costs/proficiency of collective tasks as function of turbulence & officer/NCO fill.
T_{S2}	1. Identify level, type and source of training that produced proficiency.	Variable 25: Validate the effectiveness and efficiency of training devices.	
T_A	1. Obtain tank crew Table VIII scores. 2. Assess level, type and source of training that produced proficiency.	Core A: Continue validation of threat oriented SM/ARTEPs. Core B: Determine time/costs to achieve proficiency. Variable 16: Determine effects of stability and turbulence. Variable 17: Determine effects of reduced off/NCO fill.	
T_{A2}	1. Assess level, type and source of training that produced proficiency.	Variable 25: Validate the effectiveness and efficiency of training devices.	

10 Apr 76

WORKSHEET

TITLE: M60A1 SWI-SCALED RANGE SUBCALIBER TEST SCHOOL/AGENCY: USAARMS/USATCA POC/PHONE: USAARMS COL L. Lloyd AV 464-7250; USAARMS COL R. Maxham AV 464-3546

1. OBJECTIVE(S)	2. SAMPLE SIZE	3. TEST UNIT(S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/FINAL REPORT DATE
1. Obtain data on the effect of varying the number of subcaliber firings on main gun proficiency.	40 11E EST 100 19E (4 PLTs of 25 19E)	194 ARM BDE 1 Tng Bde USAARMC	1. Demographic data.	Fire Table I-VIIC 15 May - Aug 15 May 12 Jun	T_I, T_{S2}	1. Ind Tng RES to PROF	I-Phase I 30 Aug P-T+180 days EST 9 Nov
2. Determine optimal number of iterations to be used in basic armor training gunnery.	Each PLT w/fire 4 samples of 4 variations for a total sample of 400.		2. Table I-VIIC Score Cards 194 BDE (modified Table IV, Table VI modified to reflect Table IV)				
3. Determine resources to proficiency by determining costs associated with iterations.							
4. Correlate proficiency w/personal background/ physical observations.							

M60A1 SCALED RANGE SUB CALIBER EX

DELIVERABLE SUMMARY

	TEST ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
T_I / T_S	1. Obtain demographic data. 2. Fire Tables IV-VI main gun by platoon. 3. Cost each main gun iteration & correlate cost to proficiency.	Core 8: Determine time/costs to achieve proficiency. Variable 3: Determine allocation of tasks between instit/unit. Variable 18: Determine effects of less capable trainees.	1. Determine the most cost/time efficient program to reach 95% proficiency on tank crew SM tasks. 2. Determine costs/time. 3. Determine frequency of this program vs frequency of regular program.
T_{S2}	1. Fire Scaled Range Subcaliber tables I-III. 2. Vary number of iterations on scaled range table IV. 3. Fire Table VIIC with DILLARM Cal .50. 4. Cost each iteration & correlate cost w/main gun/DILLARM proficiency.	Variable 20: Develop training concept to proficiency with reduced resources. Variable 25: Validate the effectiveness and efficiency of training devices.	
T_A			
T_{A2}			

10 Apr 78

WORKSHEET

TITLE: M60A1 SWT TRAINING TIME RATIO SCHOOL/AGENCY: USAARMS/ARTS POC/PHONE: LTC G. Bloedorn AV 356-1461 COL R. Maxham AV 464-3546

1. OBJECTIVES	2. SAMPLE SIZE	3. TEST UNIT (S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/ FINAL REPORT DATE
1. Determine the optimum ratio of individual training (T_S) to collective training (T_A) as a function of varying individual training time in the training base (T_I).	1. BDE size (3-4 Bn) sample of Cdrs & Tng staff	41D	1. Tng Base Alternatives POI w/alt unit T_S rqt's.	Ft Carson Survey to be conducted in late April.	$T_I - T_S$	PROG to PROP	I-31 May F- 1 Jul
2. Determine resource requirements for varying the lengths of training periods (12, 13, 14 & 15 week variations).			2. Questionnaire for unit commander & staff concerning preparation of alt unit tng programs.		$T_I - T_A$		
3. Determine the impact on unit training, readiness & installation responsibilities as a result of varying lengths of training periods (12, 13, 14 & 15 week variations).					$T_I - T_A$		

	TEST ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
T_I & T_S	1. Prepare notional OSUT training programs to determine differing levels of SM skills for 19E/F BAT for 12, 13, 14 & 15 week courses. 2. Prepare list of SM skills in terms of hours & subjects to be taught in unit for 12, 13, 14, & 15 week courses. Determine resource requirements.		Determine unit collective proficiency as a function of additional weeks of individual training (1, 2, 3 & 4 weeks).
T_{S2}			
T_A	1. Determine impact on unit training programs, readiness & installation responsibilities as a result of varying BAT course length by conducting unit training seminar w/bn cmd & staff.	Core A: Continue validation of threat oriented SM/ARTEPs. Variable 3: Determine allocation of tasks between instit/unit. Variable 11: Determine effect of expanded OSUT for sel high-pri wpns.	
T_{A2}			

10 Apr 78

WORKSHEET

TITLE: M60A1 SWT ADD-ON XM-1 OTII

SCHOOL/AGENCY: USAARMS/OTEA

POC/PHONE: CSTE-TM-AR (OTEA) AV 289-2384; COL R. Maxham AV 464 3546

1. OBJECTIVE(S)	2. SAMPLE SIZE	3. TEST UNIT(S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/FINAL REPORT DATE
1. TEA 85 CORE OBJECTIVES: A. Validate threat oriented critical SM/ARTEP tasks, conditions & standards.	1. One XM-1 PLT	Ft Bliss TX Units TBD	1. Demographic questionnaire.	May - Dec (T date 15 May)	T_I, T_S, T_A	1. RES to PROF	I-Raw Tng data avail from 10 Jul
B. Determine time/costs to proficiencies for critical indiv/coll tasks.	2. One M60A1 PLT		2. Training history.	(Train-up 15 May - 2 Jul)		2. PROG to PROF	F-T+285 (approx 1 Mar 79)
C. Develop diagnostic tests to measure indiv/coll learning decay levels.	3. Two aggressor TK PLTs		3. ARI developed diagnostic analysis.				
D. Determine decay rate & frequency of retraining required to sustain proficiency.							
2. TEA SITUATIONAL VARIABLES: 2. Resources/effect of tng common vs. tech skills only in tng base.							
13. Determine training packets to ensure supervisor competence.							
24. Develop tng programs to assimilate new equipment.							

10 Apr 78

WORKSHEET

TITLE: REDEYE

SCHOOL/AGENCY: USAADS FT BLISS

POC/PHONE: CPT O'Toole 978-2340/3114; MR. Dale Tubbs USA TRASANA

1. OBJECTIVE(S)	2. SAMPLE SIZE	3. TEST UNIT(S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/FINAL REPORT DATE
1. To determine and associate training resource costs of REDEYE with those tasks essential to sustain and fight with the system.	1. AIT-120 troops	FORSCOM 4ID 82ABN 101ABN 1ID 9ID	1. ARI attitude tests. AIT and unit.	20-21 Mar, Ft S. Houston, TX ARR VII 22-24 Mar, Denver, CO ARR VIII	ES T_I, T_S, T_A, T_{S2}	RES to PROG	I-N/A P-Draft 1 Jul
2. To determine the relationship of training programs to proficiency. Of particular concern is the decay of proficiency as a function of time.	2. Unit-25 to 150 troops/unit	III CORPS 3 ACR 49AD (ARNG) 2AD 1CAV 218 INF BDE (RC)	2. ARTS questionnaires. a. Range ring b. RELS c. AIT Tng d. Unit Tng e. NCO	28-30 Mar, Ft Polk, LA 5ID 31 Mar, Cherry Point, NC 3LAAM	T_I, T_S, T_A, T_{S2}	PROG to PROF	
3. To determine a methodology for utilizing variable levels of proficiency as parametric values in current war simulations.	3. RC-25 troops/unit	5ID 7ID 24ID		3-7 Apr, Ft Bragg, NC 82ABN, 24ID, 3 LAAM 8 Apr, El Paso, TX 49AD (ARNG)	T_S, T_A, T_I, T_{S2}	PROF to War Mdl	
4. To develop a methodology to determine REDEYE crew effectiveness as opposed to individual task proficiency.		USAREUR VII CORPS 8ID Berlin Brigade 1AD 3ID		17-18 Apr, El Toro, CA 3 MASS 17-21 Apr, Ft Bliss, TX 3 ACR	T_S, T_A	Ind Tng excursion	
5. To determine and improve the ability of current war models to give a measure of CE.		OTHER 25ID-Hawaii 2ID-Korea		24-28 Apr, Ft Bragg, NC 101 ABN (REDEYE & RELS Firing) 24-28 Apr, Finthen, GER 8ID			
6. To investigate and comment on the impact on proficiency expected from varying the mix of institutional and unit				1-5 May, Schwabach, GER 1AD 1-5 May, Ft Riley, KS 1ID			

(continued on next page)

WORKSHEET

TITLE: REDEYE (Continued from previous page) SCHOOL/AGENCY: POC/PHONE:

1. OBJECTIVES	2. SAMPLE SIZE	3. TEST UNIT (S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/ FINAL REPORT DATE
training and changes in training techniques and technology.	(See Page 1)	(See Page 1)	(See Page 1)	8-12 May, Vilseck, GER 3ID	T_I, T_{S1},	PROG to PROF	(See Page 1)
				9 May, Ft Bliss, TX 3 ACR (RELS Firing)	T_{A1}, T_{A2}		
7. To describe the impact on proficiency of personnel turbulence, stability and capability and to develop the fluctuations in proficiency due to these variables.				11-12 May, Ft Ord, CA 7ID	Turbulence	Personnel program excursion	
				14-19 May, Ft Lewis, WA 9ID (RELS Firing)			
8. To assess the benefits and costs associated with utilizing training devices in lieu of other training resource requirements and the impact of reduced resources.				15-19 May, Camp Case, Korea 2ID	RES T_I, T_S, T_A	RES to PROG	
				16-18 May, Zaragosa, AB, Spain Berlin Brigade			
				20-21 May, Ft Bragg, NC 218th SCNG	T_I, T_S, T_A	RC Excursion	
9. To define possible intensified programs which might be offered by institutions to RC units and the resultant impact on proficiency.				20-26 May, Fatima, Okinawa 2 MASS			
				29 May-2 Jun, Schofield Bks, HI 25ID			
10. To define the interoperability impact relative to other user nations.				16-23 Jun, Ft Hood, TX 2 ARM (RELS Firing)			
				16-23 Jun, Ft Hood, TX 1 CAV (RELS Firing)			
				3-7 Jul Ft Carson, CO 4ID (RELS Firing)			

	TEST ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
T_{I} S T_{S}	1. REDEYE engagement tests using live tracking. 2. Attitude questionnaires.	Core A: Continue validation of threat oriented SM/ARTEPS. Core B: Determine time/costs to achieve proficiency. Core D: Determine decay rates and frequency of required retraining. Variable 3: Determine allocation of tasks between instit/unit. Variable 18: Determine effects of less capable trainees.	1. Determine time/cost to achieve and maintain individual proficiency. 2. Identify critical SM/ARTEP tasks. 3. Determine frequency of retrain. 4. Determine above for less capable trainees. 5. Determine effect of turbulence on crew proficiency. 6. Determine time and ability to train-up.
T_{S2}	1. REDEYE engagement tests using MTS, RCMAT, BATS, THT, IVT (Institution & unit).	Core A: Continue validation of threat oriented SM/ARTEPS. Core B: Determine time/costs to achieve proficiency. Variable 19: Evaluate rapid refresher training programs. (Insights only) Variable 20: Develop training concept to proficiency with reduced resources. Variable 25: Validate the effectiveness and efficiency of training devices.	
T_{A}	1. REDEYE engagement test using live tracking. 2. Unit training survey.	Core A: Continue validation of threat oriented SM/ARTEPS. Core B: Determine time/costs to achieve proficiency. Core D: Determine decay rates and frequency of required retraining. Variable 3: Determine allocation of tasks between instit/unit. Variable 16: Determine effects of stability and turbulence.	
T_{A2}	1. REDEYE engagement tests using MTS, RCMAT, BATS, THT, TVT.	Core A: Continue validation of threat oriented SM/ARTEPS. Core B: Determine time/costs to achieve proficiency. Variable 19: Evaluate rapid refresher training programs. (Insights only) Variable 20: Develop training concept to proficiency with reduced resources. Variable 25: Validate the effectiveness and efficiency of training devices.	

10 Apr 78

WORKSHEET

[illegible] FINAL TRAINING FOR IIH

SCHOOL/AGENCY: [illegible] POC/PHONE: MAJ Bradley 835-2773/5551

1. [illegible]	2. SAMPLE SIZE	3. TEST UNIT(S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/FINAL REPORT DATE
[illegible] training resources and associated cost of implementing IIH training program	3 INF BNS 3 INF BNS	4ID 9ID	Instit data to be forecasted.	Data gathered 17 Feb - 30 Apr	T_I, T_S	RES to PROG to PROF	I-15 Jun 78 F-20 Jul 78
	1 TLAT BN	TLAT BN (ARNG)	Course cost resource form.		T_{S2}, T_A		
A. Cost to train in institution.	TOTAL = 7 BNS		Tng resource data BN and lower.				
B. Cost to train in A[illegible] units.			Course cost data. for DIV & BDE school.				
[illegible]. Cost to train in R[illegible] units.			Course cost and Tng resource form (TLAT).				
D. Cost to implement [illegible] training.			Course cost resource form (TLAT).				

11H, INSTITUTIONAL TRAINING

DELIVERABLE SUMMARY

	TEST ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
T_I	Use various forms to describe training resources and associated cost of implementing 11H MOS training.	Core 8: Determine time/costs to achieve proficiency.	1. Determine time/frequency/costs/proficiency for varying levels of turbulence for training of TOW SM skills in units.
T_S	1. Cost to train in institution. 2. Cost to train in AC units. 3. Cost to train in RC units.	Variable 3: Determine allocation of tasks between instit/unit. Variable 12: Determine exportable training packages to support training.	2. Determine the most cost effective means of training to 95% proficiency in SM skills in units.
T_{S2}	1. Cost to train in AC Units. 2. Cost to train in RC units.	Variable 12: Determine exportable training packages to support training.	
T_A	1. Cost to train in AC units. 2. Cost to train in RC units.	Variable 12: Determine exportable training packages to support training.	
T_{A2}			

[illegible] MAJ Bradley, [illegible] 2773

1. [illegible]	2. SAMPLE SIZE	3. TEST UNIT [illegible]	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/ FINAL REPORT DATE
Comparison of [illegible] vs unit training to proficiency (initial MOS qualification only).	[illegible] INF BNs 3 INF BNs 1 FLAT BN Current P[illegible] course TOTAL = [illegible] BNs	41[illegible] 9[illegible] FLAT BN ARNG	Resource, cost data collection form. Prof data - M[illegible] Qual Table. [illegible] OTIII prof scores. TOW TEA test scores.	1 Feb-30 Apr: survey of units. Similar data gathered for TOW gunners trained at Ft Benning. TRADOC DCSRM will compare costs.	T_1, $T_{[illegible]}$, T_A $T_{[illegible]}$	REL to PROF to PROF	1-15 Jun 78 F 20 Jul 78

COMPARISON OF UNIT TOW TNG
VS INST TOW TNG

D LIVERABLE SUMMARY

5 April 1978

ITEM	INTERFACE W/TASK/CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
Use [illegible], [illegible] proficiency scores and TOW [illegible] test statistics to make comparison of institutional vs unit training (Initial MOS qualification only).	Core B: Determine time/costs to achieve proficiency. Variable 3: Determine allocation of tasks between institution/unit. Variable 5: Determine impact of transfer of selected AIT to FORSCOM.	1. Determine time/cost/frequency/proficiency of SM skills for varying turbulence levels (unit data). 2. Determine the most cost effective manner of achieving 95% proficiency. 3. Determine training costs.
Use proficiency data from M70 qualification table to make a comparison of institutional vs unit TOW training (Initial MOS qualification only).	Variable 12: Determine exportable training packages to support training.	

10 April 1978

WORKSHEET

TITLE: UNIT PROFICIENCY MAINTENANCE & ITV TNG SCHOOL/AGENCY: USAIS/USAIS POC/PHONE: MAJ BRADLEY, AV 835-2773/5551

1. OBJECTIVES	2. SAMPLE SIZE	3. TEST UNIT (S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/ FINAL REPORT DATE
To associate unit TOW gunner proficiency to unit POI, training resources and the associated cost of implementing ITV training in both unit and institution.	3 INF BNs 3 INF BNs 1 TLAT BN TOTAL = 7 BNs	4ID 9ID TLAT BN (ARNG)	Training data forms.	1 Feb-30 Apr TOW units gather data on TOW training to include resources (SWT uses data to build POIs for unit training) (TRADOC/FORSCOM det annual cost of Tng).	T_S, T_{S2} T_A	RES to PROG to PROF	I-15 Jun F-20 Jul
				ITV COI tentatively validated during ITV OTIII - FORSCOM & USAREUR est cost to implement ITV COI.			I-15 Jun F-20 Jul
				SWT assess impact of ITV on unit training.			

UNIT PROFICIENCY MAINTENANCE AND ITV TRAINING

DELIVERABLE SUMMARY

	TEST ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
T_I & T_S	1. Use training data forms to associate unit TOW gunner proficiency to unit POI, training resources and associated cost of implementing ITV training in both unit and institution. 2. Validate ITV COI during ITV OTIII.	Core B: Determine time/costs to achieve proficiency. Variable 3: Determine allocation of tasks between institution/unit. Variable 12: Determine exportable training packages to support training.	1. Determine time/costs to achieve 95% proficiency. 2. Determine time/frequency and costs to sustain 95% proficiency.
T_{S2}	Use training data forms to associate unit TOW gunner proficiency to unit POI, training resources and associated cost of implementing ITV training in both unit and institution.		
T_A	Use training data forms to associate unit TOW gunner proficiency to unit POI, training resources and associated costs of implementing ITV training in both unit and institution.	Core B: Determine time/costs to achieve proficiency. Variable 12: Determine exportable training packages to support training.	
T_{A2}			

10 Apr 78

WORKSHEET

TITLE: TOW/ITV TRAINING WEAKNESSES (STUDY) SCHOOL/AGENCY: USAIS/USAIS POC/PHONE: MAJ [illegible]dley, 835-2773/5551

1. OBJECTIVES	2. SAMPLE SIZE	3. TEST UNIT (S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/ FINAL REPORT DATE
To identify major weaknesses/ deficiencies in unit/institution training for the P4 and 11H (ITV)	3 INF BNs	4ID	NONE	Review TOW tng studies, obs made during ITV OTIII and TOW TEA tests/studies.	T_I	RES to PROF	I-15 Jun F-20 Jul
	3 INF BNs	9ID			T_S, T_{S2}		
	1 TLAT BN	TLAT BN (ARNG)		Data gathered 1 Feb-30 Apr 78	T_A		
(To make Army TOW training the best allowable given resource constraints)	P4 Course	USAIS					
	TOTAL = 7 BNs						

	TEST ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/BATTALION TRAINING
T_I & T_S	Review TOW training studies and observations made during ITV OTIII and TOW TEA.	Core B: Determine time/costs to achieve proficiency. Variable 3: Determine allocation of tasks between instit/unit.	Validate decay and frequency retrain requirements based on varying turbulence levels.
T_{S2}			
T_A	Review TOW training studies and observations made during ITV OTIII and TOW TEA.	Core B: Determine time/costs to achieve proficiency.	
T_{A2}			

10 Apr 78

WORKSHEET

TITLE: TOW IEA TEST SCHOOL/AGENCY: USAIS/TCATA POC/PHONE: CPT Hanna, 737-9409; MAJ Bradley, 835-2773/5551

1. OBJECTIVES	2. SAMPLE SIZE	3. TEST UNIT (S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/ FINAL REPORT DATE
1 Conduct part one of TOW WSTEA to: Evaluate alternative TOW training programs. Establish correlation between M70 scores and live fire. Validate ARI gunner selection models. Evaluate contribution of live-round firing to gunner proficiency. War game model - effect on proficiency of differing levels of model - sensitive TOW gunnery skills.	3 groups of 90 each (indiv soldiers, not previously TOW trained). TOTAL=270	5D	ARI Field Form	Ft Hood, TX, 13 Mar - 28 Apr	T_I, T_S T_{S2} T_A, T_{A2}	PROG to PROF through War Mdl to CE	I-15 Jun F-20 Jul

	TEST ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
T_S	Validate ARI Gunner Selection Models.	Variable 18: Determine effects of less capable trainees.	1. Determine time/frequency/cost/proficiency as a function of less capable trainees. 2. Determine the most cost effective manner of achieving 95% proficiency. 3. Determine time/frequency/cost/proficiency of this means.
T_{S2}	Compare three alternative training programs using missile firings following a sequential methodology. A. Establish correlation between M70 scores and live fire. B. Evaluate contribution of live-round firing to gunner proficiency.	Variable 3: Determine allocation of tasks between institution/unit. Variable 12: Determine exportable training packages to support training. Variable 19: Evaluate rapid refresher training programs. Variable 25: Validate the effectiveness and efficiency of training devices.	
T_A			
T_{A2}	War game model - use TEA data to determine effect on proficiency of differing levels of model-sensitive TOW gunnery skills.	Core A: Continue validation of threat oriented SM/ARTEPs. Variable 18: Determine effects of less capable (Input data to TRASANA war models)	

5 Apr 78

WORKSHEET

TITLE: WAR GAME MODEL: RELATE LEVELS OF TOW PROF TO CE   SCHOOL/AGENCY: [illegible] /TRASANA   POC/PHONE: MAJ [illegible] 258-[illegible]/3708; [illegible]adley 835-2273/5551

1. [illegible]	2. SAMPLE SIZE	3. TEST UNIT(S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/FINAL REPORT DATE
[illegible] different TOW [illegible] proficiency levels [illegible] a war model [illegible] (cont)	Past testing & TOW crew team [illegible] tion time 13 crews	197 INF BDE	N/A	[illegible] TOW TEA (test 13 Mar - 20 [illegible] 78) [illegible] Mar - [illegible] May test analysis, model [illegible], analysis by TRASANA.	T_I, T_S T_A	PROF to CE	I-30 Jun F-20 Jul

DELIVERABLE SUMMARY

ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
TRASANA use war model to relate different TOW gunner proficiency levels to CE.	Core A: Continue validation of threat oriented SM/ARTEPs. Variable 18: Determine effects of less capable trainees.	N/A
TRASANA use war model to relate different TOW gunner proficiency levels to CE.	Core A: Continue validation of threat oriented SM/ARTEPs. (Compare present capability with threat oriented capability requirements). Variable 18: Determine effects of less capable trainees.	
TRASANA use war model to relate different TOW gunner proficiency levels to CE.	Core A: Continue validation of threat oriented SM/ARTEPs. Variable 18: Determine effects of less capable trainees.	
TRASANA use war model to relate different TOW gunner proficiency levels to CE.	Core A: Continue validation of threat oriented SM/ARTEPs. Variable 18: Determine effects of less capable trainees.	

5 April 1978

WORKSHEET

[illegible] SELECTION CRITERIA Comparative Study   SCHOOL/AGENCY USAIS/ARI   POC/PHONE: Dr. Cartner 737-9017; MAJ Bradley 835-2773/5551

	2. SAMPLE [illegible]	4. DATA COLLECTION PLAN	[illegible] TEST DATES/ [illegible]TIVITIES	[illegible]	[illegible] MODEL	[illegible] INTERIM/ FINAL REPORT DATE
[illegible] the impact of [illegible] selection [illegible] personnel [illegible] subsystems.	[illegible] TOW [illegible] 3 groups of 90 ea (indiv soldiers not previously TOW trained) TOTAL=270	"[illegible]" demographic [illegible], TOW System [illegible], ARI TOW/Dragon Gunner Selection Criteria Study. Use ARI field forms.	[illegible] demographics from [illegible]. Model validated [illegible] in TOW TEA Mar-Apr	[illegible] T_A	[illegible]	I-15 Jun F-20 Jul

DELIVERABLE SUMMARY

	TEST ACTIVITY	INTERFACE W/TEA 'HS CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
T_I T_S	Study demographics from A^2S^2, TOW System Evaluation, ARI TOW/Dragon Gunner Selection Criteria Study.	Variable 18: Determine effects of less capable trainees. Variable 19: Evaluate rapid refresher training programs.	Determine time/frequency/costs/proficiency of SM tasks as a function of less capable trainees.
T_{S2}			
T_A	Study demographics from A^2S^2, TOW System Evaluation, ARI TOW/Dragon Gunner Selection Criteria Study.	Variable 18: Determine effects of less capable trainees.	
T_{A2}			

10 April 1978

WORKSHEET

PROPONENT AGENCY CATB USAIS POC/PHONE MAJ Bradley, 2773/5551

	2.	3. TEST UNIT	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/ FINAL REPORT DATE
1. ... provide insights ... Reserve Component training resource requirements and other problems related with TOW training.	1 TLAT BN	TLAT BN (ARNG)	Course resource data form. Training data form.	Data gathering 1 Feb - 30 Apr	T_I, T_S, T_A	RES to PROG to PROF	I-15 Jun F-20 Jul
2. Informal evaluation of TEC lesson support to TOW training.	1- TLAT BN	TLAT BN	TEC questionnaire.	Data gathering 1 Feb - 30 Apr	T_{S2}, T_{A2}	PROG to PROF	I-15 Jun F-20 Jul

DELIVERABLE SUMMARY

[illegible] ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/BATTALION TRAIN[illegible]
T_S [illegible] requirements [illegible] with [illegible]	Core 3: Determine time/costs to achieve proficiency. Variable 12: Determine exportable training packages to support training. Variable 19: Evaluate rapid refresher training programs.	Determine tasks, time, frequency [illegible], costs and proficiency for each TEC lesson. Compare input - output with T_S - Analyze make recommendations as to most mission/[illegible] effective program.
T_{S2} [illegible] evaluation of [illegible] lessons.	Variable 25: Validate the effectiveness and efficiency of training devices.	
T_A [illegible] as $T_I + T_S$	Same at $T_I + T_S$	
T_{A2} [illegible] valuation of the lessons.	Variable 25: Validate the effectiveness and efficiency of training devices.	

10 Apr 78

WORKSHEET

TITLE: DIVISION RESTRUCTURING STUDY (DRS) SCHOOL/AGENCY: USAIS/TCATA POC/PHONE: CPT Hanna, 737-9409; MAJ Bradley, 835-2773/5551

1. OBJECTIVES	2. SAMPLE SIZE	3. TEST UNIT (S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/ FINAL REPORT DATE
*Document resources and resulting proficiency associated w/intensive short-term TOW training.	3 DRS BNs	1 CAV	TCATA forms	Ft Hood, TX, Ph 1 ended 14 Feb	T_S, T_A	RES to PROG to PROF	I-15 Jun F-20 Jul
*TCATA reviewing — may not provide training data of use to ARTS.							
Obtain data on crew/unit proficiency for use in TRASANA war game model.	3 DRS BNs	1 CAV	NONE	Ft Hood	T_A	PROG to PROF	I-TBD F-TBD

	TEST ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
T_I & T_S	Document resources and resulting proficiency associated with intensive short-term TOW training.	Core A: Continue validation of threat oriented SM/ARTEPS. Core B: Determine time/costs to achieve proficiency. Variable 19: Evaluate rapid refresher training programs.	1. Determine time/frequency/costs/ proficiency in SM tasks using the most cost effective programs as a function of varying levels of turbulence. 2. Determine time/frequency/costs/ proficiency in ARTEP tasks using the most cost effective programs as a function of varying levels of turbulence.
T_{S2}			
T_A	Document resources and resulting proficiency associated with intensive short-term TOW training.	Core B: Determine time/costs to achieve proficiency. Variable 19: Evaluate rapid refresher training programs.	
T_{A2}			

5 Apr 78

WORKSHEET

TITLE: ITV OTIII SCHOOL/AGENCY: USAIS/OTEA POC/PHONE: MAJ Hotard/355-8248

1. OBJECTIVE(S)	2. SAMPLE SIZE	3. TEST UNIT(S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/FINAL REPORT DATE
Extract data from ITV OTIII	34 TOW troops	9ID	On site eval by OTEA.	15 Jan - 30 Apr	T_I, T_S, T_A	RES to PROF	I-15 Jun F-20 Jul
A. Assessment of retention of TOW Gunner skills.	As a part of 1 mech INF CO and 1 ARM CAV PLT						
B. Development of ITV COI.							
C. Forecast of training resource requirements.	TOTAL= 1 CO & 1 PLT						
D. Impact of ITV on instit and unit training.							

[illegible] | [illegible] | 5 April 1978

	[illegible]	[illegible]	INTERFACE W/BATTALION TRAINING MODEL
[illegible]	[illegible] Programs to develop [illegible] proficiency to support crew/ platoon training.	Core A: Continue validation of threat oriented SM/ARTEPs. Core C: Develop diagnostic test to measure proficiency and decay levels. Core D: Determine decay rates and frequency of required retraining. Variable 12: Determine exportable training packages to support training.	1. Time/frequency/costs/ proficiency of SM tasks as function of varying levels of turbulence & trainer capability. 2. Time/frequency/costs/proficiency in ARTEP tasks as function of varying levels of turbulence & trainer capability.
T_{S2}			
T_{A}	1. Train Inf crews and Armd Cav sqds to operate ITV system. 2. Live-fire exercises against multiple targets. 3. Conduct series of Armd Cav Recon Plt and Mech Inf Co exercises vs a threat force.	Core A: Continue validation of threat oriented SM/ARTEPs. Core C: Develop diagnostic tests to measure proficiency and decay levels. Variable 12: Determine exportable training packages to support training.	
T_{A2}			

5 Apr 78

WORKSHEET

TITLE: ITV [illegible] STUDY SCHOOL/AGENCY: USAIS POC/PHONE: MAJ Bradley 835-2773/5551

1. OBJECTIVE(S)	2. SAMPLE SIZE	3. TEST UNIT(S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/FINAL REPORT DATE
Determine most cost effective method and location (instit/unit) to teach ITV gunner/crew tasks.	Based on OTIII data.	Study	On-site evaluation from OTIII.	15 Jan - 30 Apr	T_I, T_S, T_A T_{S2}	RES to PROG to PROP	I-15 Jun P-28 Jul

	TEST ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
T_I & T_S	Gather data on most cost effective method and location (institution/unit) to teach ITV gunner/crew tasks.	Core B: Determine time/costs to achieve proficiency. Variable 3: Determine allocation of tasks between instit/unit.	1. Determine the most cost effective method of achieving 95% proficiency. 2. Cost the selected method for SM tasks.
T_{S2}	Correlate proficiency on M70 trainer with live fire gunner proficiency (TOW TEA).	Variable 20: Develop training concept to proficiency with reduced resources. Variable 25: Validate the effectiveness and efficiency of training devices.	
T_A	Gather data on most cost effective method and location (institution/unit) to teach ITV gunner/crew tasks.	Core B: Determine time/costs to achieve proficiency. Variable 3: Determine allocation of tasks between instit/unit. Variable 20: Develop training concept to proficiency with reduced resources.	
T_{A2}			

WORKSHEET

TITLE: TOW COSTING METHODOLOGY SCHOOL/AGENCY: USAIS/USAIS POC/PHONE: MAJ Bradley, 835-2773/5551

1. OBJECTIVES	2. SAMPLE SIZE	3. TEST UNIT (S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/ FINAL REPORT DATE
Make costs/resource comparisons:			Course Cost Data Form, (Survey of formal TOW gunner courses conducted tng within divisions) tng Data Form (Form surveying unit tng designed and conducted by units (to sqd level) designed to achieve a specific objective)	Data gathering 1 Feb - 30 Apr		RES to PROG to PROF	I-15 Jun F-20 Jul
A. Gunner training in instit/unit.	3 INF BNs 3 INF BNs 1 TLAT BN ST 7 BNs	4ID 9ID TLAT BN (ARNG)			T_I, T_S		
B. DRS vs TLAT maint training.	3 BNs 1 TLAT BN ST 4 BNs	1 CAV TLAT BN (ARNG)			T_S, T_A		
C. AC Unit vs TLAT Tng.	3 INF BNs 3 INF BNs 1 TLAT BN ST 7 BNs TOTAL=18 BNS	4ID 9ID TLAT BN (ARNG)	Forms surveying maint tng which is not formally structured but consists of a series of tng elements		T_S, T_A		

	TEST ACTIVITY	INTERFACE W/TRA 'HS CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
T_I & T_S	1. Cost gunner training in institution/unit. 2. Cost DRS vs TLAT maintenance training. 3. Cost of current AC vs TLAT organizational training.	Core B: Determine time/costs to achieve proficiency. Variable 3: Determine allocation of tasks between instit/unit.	1. Determine most cost effective manner of achieving 95% proficiency in SM skills. 2. Cost the selected method.
T_{S2}			
T_A	Cost of current AC vs TLAT organizational training.	Core B: Determine time/costs to achieve proficiency.	
T_{A2}			

10 Apr 78

WORKSHEET

TITLE: FO/UNIT TRAINING TEA 78 SCHOOL/AGENCY: USAFAS FT SILL POC/PHONE: LTC John O. Neal, AV 639-3518

1. OBJECTIVE(S)	2. SAMPLE SIZE	3. TEST UNIT(S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/FINAL REPORT DATE
To determine the relationship between the level of proficiency of FOs and unit training programs.	144 troops (24 Off/Div) (24 13F/Div)	4ID 2AD 1 CAV	1. Unit tng mgt survey. 2. FO SQT written exam. 3. FO questionnaire.	Dates: May - Jun	T_S, T_A	PROG to PROF	I-1 Jul F-1 Oct

	TNG ACTIVITY	INTERFACE WITH TNG CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
	1. SQT type written test on call for adjustment of fire. 2. Self-location and target location test w/map correlation.	Core A: Continue validation of threat oriented SM/ARTEPs. Core B: Develop diagnostic test to measure proficiency. Variable 17: Determine effects of reduced off/NCO fill. (Possible insights)	1. Validate critical SM/ARTEP tasks. 2. Determine individual and unit proficiency based on [illegible] training programs. 3. Determine most efficient (time & dollars) costing of FO training. 4. Determine impact of turbulence on proficiency.
T_{S2}			
T_A	1. Conduct review/discussion of unit FO training programs. Use survey format to insure commonality. 2. Administer questionnaire to obtain opinions on the adequacy of training programs.	Core A: Continue validation of threat oriented SM/ARTEPs. Core B: Determine time/costs to achieve proficiency as reflected by unit training schedules. Variable 16: Determine effects of stability and turbulence. Variable 17: Determine effects of reduced off/NCO fill.	
T_{A2}			

WORKSHEET

TITLE: ______ SCHOOL/AGENCY: ______ POC/PHONE: ______

1. OBJECTIVES	2. SAMPLE SIZE	3. TEST UNIT (S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/ FINAL REPORT DATE
1. To determine the impact of the degree/intensity of the use of tng devices in the institution has on individual prof.	300 troops total 1 OBC CLASSES (200 Off) 5 13F CLASSES 20-50 EM/ CL	NONE	1. Institution background questionnaire. 2. STEP Test. 3. OBS fire exam. 4. Institution questionnaire. 5. Final OBS fire exam. 6. Instructor questionnaire.	Resident courses OBC: 13 Jun 13F: 16 Jun COMPL: 30 Sep	T_{I}, T_{I2}	PROG to PROF	[illegible]
2. To determine the impact of the degree/intensity of use of tng devices in the unit has on individual training.	93 troops TOTAL 30 (5-7 Per Div) 63 troops (Basic CTEA)	4ID 9ID 2AD 1 CAV III Cps Ft Knox	1. TAC unit background questionnaire. 2. STEP Test. 3. OBS fire exam. 4. Unit questionnaire. 5. Final OBS fire exam. 6. Instructor questionnaire.	Dates: TBD	T_{S1}, T_{S2}	PROG to PROF	
3. To determine the impact of changes in the techniques/ technology on indiv tng.	Total - Per troop			Analysis of data	[illegible]	PROG to PROF	

	TEST ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
T_I & T_S	1. Variation of mix of OFT vs Live Fire Instruction. 2. Test, Train-up and Retest EM Observers Recalled from Divs.	Core B: Determine time/costs to achieve proficiency. Core C: Develop diagnostic tests to measure proficiency. Variable 19: Evaluate rapid refresher training programs. (The results may provide insights on PC use of these devices for rapid train-up) Variable 25: Validate the effectiveness and efficiency of training devices.	1. Allows most efficient costing (time & dollars) of FO training 2. Measure proficiency based on various training methods. 3. Determine time and frequency to train-up to proficiency.
T_{S2}	1. Test of OFT.	Core B: Determine time/costs to achieve proficiency. Variable 25: Validate the effectiveness and efficiency of training devices.	
T_A			
T_{A2}	1. Test of OFT.	Core B: Determine time/costs to achieve proficiency. Variable 25: Validate the effectiveness and efficiency of training devices.	

10 Apr 78

WORKSHEET

TITLE: SUITABILITY OF 13F EXPORTED TRAINING   SCHOOL/AGENCY: USAFAS FT SILL   POC/PHONE: LTC John O. Neal, AV 639-5903/3518

1. OBJECTIVE(S)	2. SAMPLE SIZE	3. TEST UNIT(S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/FINAL REPORT DATE
1. To determine the impact of replacing portions of current institutional courses (13F) with training programs designed for unit execution.	48 troops 2 13F Classes	Prev support in OFT test.	Prev surveys in OFT test.	Analysis	T_I, T_{S1}, T_{S2} T_{A1}, T_{A2}	PROG to PHUF	I-15 Dec F-15 Feb 79

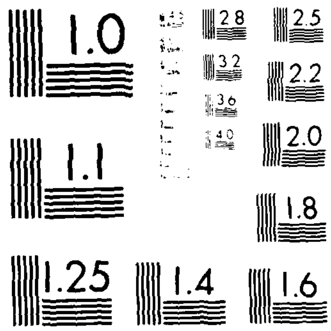
SUITABILITY OF 13F EXPORTED TRAINING

DELIVERABLE SUMMARY

	TEST ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
T_I & T_S	1. Two 13F resident courses receive modified COI (base COI less training appropriate for unit training augment by exportable packages, end of course proficiency measure & compared to base COI proficiency.	Core B: Determine time/costs to achieve proficiency. Core C: Develop diagnostic tests to measure proficiency. Variable 12: Determine exportable training packages to support training. Variable 5: Determine impact of transfer of selected AIT to FORSCOM.	1. Validate critical SM tasks from previous tests. 2. Determine most efficient (time & dollars) methods mixes of training. 3. Determine & measure proficiency as result of train-up packages.
T_{S2}		Variable 3: Determine allocation of tasks between instit/unit.	
T_A			
T_{A2}			

AD-A186 322 ARMY TRAINING STUDY: TRAINING EFFECTIVENESS ANALYSIS (TEA) SUMMARY(U) ARMY TRAINING AND DOCTRINE COMMAND FORT MONROE VA F J BROWN ET AL 08 AUG 78 2/4

UNCLASSIFIED SBI-AD-F000 186 F/G 15/1 NL



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

10 Apr 78

WORKSHEET

TITLE: CONFIRM 63C/H SQT AS A MEASURE OF PROFICIENCY SCHOOL/AGENCY: USAOCCS POC/PHONE: Mr. Oliver 283-3170/4460

1. OBJECTIVE(S)	2. SAMPLE SIZE	3. TEST UNIT(S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/FINAL REPORT DATE
Confirm SQT as a measure of proficiency.	Approx 475 E2-E4 Approx 120 E5 and above	1ID 4ID 5ID 49AD (ARNG) 8ID	1. Background data 2. OJT data 3. Performance tests 4. Supervisors rating 5. SQT results	8ID, 24-27 Apr 1ID, 8-11 May 4ID, 6-10 Mar 5ID, 21-25 Feb 49AD, 12-15 Jun (Ft Hood, TX)	T_I, T_S	PROG to PROF	I-N/A F-Aug 78* *Administration of SQT tests originally planned for Mar-May has been rescheduled by DA for May-Jul. Computer processing will add a minimum of 6-8 weeks.

63C/H MOS CONFIRM SQT AS A MEASURE OF PROFICIENCY

DELIVERABLE SUMMARY

5 April 1978

	TEST ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
T_I & T_S	1. Obtain SQT results for MOS 63C/H. 2. Administrative performance test. 3. Correlate individual performance w/SQT.	Core A: Continue validation of threat oriented SM/ARTEPs. Variable 12: Determine effect of expanded OSUT for sel. high-pri wpns. Variable 18: Determine effect of less capable trainees.	1. Test selected tasks in critical functional areas. 2. Determine most efficient (time and dollars) methods of achieving individual proficiency. 3. Determine frequency of retrain under various training methods. 4. Develop proficiency development profiles which may be expanded to other task.
T_{S2}			
T_A			
T_{A2}			

10 Apr 78

WORKSHEET

TITLE: IDENTIFY PROFICIENCY DEVELOPMENT PROFILES SCHOOL/AGENCY: USAOCCS POC/PHONE: Mr. Oliver 283-3170/4460

1. OBJECTIVE(S)	2. SAMPLE SIZE	3. TEST UNIT(S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/FINAL REPORT DATE
Identify proficiency development profiles	Approx 475 E2-E4 Approx 128 E5 and above	1ID 4ID 5ID 49AD (ARNG) 8ID	1. Performance test results 2. Questionnaire to determine characteristics of OJT programs 3. Individual aptitude scores 4. Prior studies	8ID, 24-27 Apr 1ID, 8-11 May 4ID, 6-10 Mar 5ID, 21-25 Feb 49AD, 12-15 Jun (Ft Hood, TX)	T_{I1}, T_{I2}, T_{I3} T_{S1}, T_{S2},	PROG to PROF	I-Apr-May F-15 Jun *Data summaries will be provided as completed

63C/H IDENTIFY PROFICIENCY.

DEVELOPMENT PROFILES

DELIVERABLE SUMMARY

5 April 1978

	TEST ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
T_I & T_S	1. Administer performance test to both self pace and lockstep graduates. 2. Administer cross sectional test. 3. Analyze data to yield: a. Self pace vs lockstep	Core B: Determine time/costs to achieve proficiency. Core C: Develop diagnostic tests to measure proficiency and decay levels. Core D: Determine decay rates and frequency of required retraining. Variable 3: Determine allocation of task between instit/unit. Variable 12: Determine exportable training packages to support training. Variable 18: Determine effects of reduced off/NCO fill.	1. Determine most efficient (time & dollars) methods of achieving individual proficiency. 2. Determine frequency of retrain under various training methods. 3. Measure proficiency of less capable trainees. 4. Determine effect on proficiency of less trainer fill. 5. Develop proficiency development profiles which may be expanded to other tasks.
T_{S2}	b. Aptitude vs Retention c. Decay over time d. Decay related to experience e. Extent and relevance of OJT f. Extent and relevance of experience		
T_A	g. Mean proficiency vs mean training time 4. Retest self-paced graduates at four-six month intervals.		
T_{A2}			

10 Apr 78

WORKSHEET

TITLE: IDENTIFY COST EFFECTIVENESS OF INSTITUTIONAL AND UNIT TNG PROGRAMS SCHOOL/AGENCY: USAOCCS POC/PHONE: Mr. Oliver 283-3170/4460

1. OBJECTIVE(S)	2. SAMPLE SIZE	3. TEST UNIT(S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/FINAL REPORT DATE
Identify cost effectiveness of institutional and unit training programs.	Approx 475 E2-E4 Approx 120 E5 and above	1ID 4ID 5ID 49AD (ARNG) 8ID	1. Proficiency development profiles 2. Aptitude scores 3. Cost data from TRADOC, FORS command USAREUR 4. Unit training data 5. Productivity profiles	N/A* *Test dates are as shown for MOS 63C/H tests. Data from these tests will be studied along with other data listed under "questionnaires/surveys" column.	$T_I - T_S$ Quantity T_{S1}, T_{S2}	PROG to PROF	I-Apr-May* F-15 Jun *Data Summaries will be provided as completed.

DELIVERABLE SUMMARY

	TEST ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
T_I & T_S	Identity resources and effectiveness of combinations of institutional and unit training.	Core B: Determine time/costs to achieve proficiency. Variable 5: Determine impact of transfer of selected AIT to FORSCOM. Variable 12: Determine exportable training packages to support training. Variable 16: Determine effects of stability and turbulence.	1. Determine most efficient (time & dollars) methods of achieving individual proficiency. 2. Determine and measure proficiency as a result of using train-up packages. 3. Determine effect of turbulence on proficiency.
T_{S2}			
T_A			
T_{A2}			

10 Apr 78

WORKSHEET

TITLE: IDENTIFY OPTIMUM DISTRIBUTION OF INDIV TNG BETWEEN INST AND UNITS SCHOOL/AGENCY: USAOCCS POC/PHONE: Mr. Oliver 283-3170/4460

1. OBJECTIVE(S)	2. SAMPLE SIZE	3. TEST UNIT(S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/FINAL REPORT DATE
Identify optimum distribution of individual training between institution and units.	Approx 475 E2-E4 Approx 128 E5 and above	1ID 4ID 5ID 49AD (ARNG) 8ID	1. Proficiency development profiles. 2. Questionnaire results. 3. Resource effectiveness data. 4. Equipment operational availability.	N/A* *Test dates are as shown for MOS 63C/H tests. Data from these will be studied along with other data listed under "questionnaires/surveys" column.	T_I, T_S	PROF to CE (theoretical link)	I-Apr-May* F-15 Jun *Data summaries will be provided as completed.

IDENTIFY OPTIMUM DISTRIBUTION OF INDIVIDUAL TRAINING BETWEEN INSTITUTION AND UNIT

DELIVERABLE SUMMARY

5 April 1978

	[illegible] ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
T_I & T_S	Use of proficiency development profiles, questionnaire results, resource effectiveness data, equipment operational availability for various profiles and prior studies to identify optimum distribution of individual training between institution and unit.	Variable 3: Determine allocation of tasks between instit/unit. Variable 5: Determine impact of transfer of selected AIT to FORSCOM. Variable 18: Determine effects of less capable trainees. Variable 28: Develop training concept to proficiency with reduced resources.	
T_{S2}			
T_A			
T_{A2}			

10 Apr 78

WORKSHEET

TITLE: IDENTIFY ALTERNATIVES FOR TNG SELECTED PERSONNEL FOR MOBILIZATION SCHOOL/AGENCY: USAOCCS POC/PHONE: Mr. Oliver 283-3170/4460

1. OBJECTIVE(S)	2. SAMPLE SIZE	3. TEST UNIT(S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/FINAL REPORT DATE
Identify alternatives for training selected personnel for mobilization.	N/A	N/A	1. Army 2. Civilian courses of instruction. 3. National institute of automotive service excellence tests. 4. Data from Dept of Labor, Dept of Health, Education and Welfare.	N/A	T_S, T_S,	PROG to PROF	I-N/A F-15 Jun

DELIVERABLE SUMMARY

	TEST ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
T_I & T_S	Correlate statistics from Dept. of Labor and Dept. of Health, Education and Welfare with information from tests administrated by the National Institute of Automotive Service Excellence.	Variable 18: Determine effects of less capable trainees. Variable 19: Evaluate rapid refresher training programs.	1. Determine proficiency of less capable trainees. 2. Measure proficiency as a result of using train-up packages.
T_{S2}			
T_A			
T_{A2}			

10 Apr 78

WORKSHEET

TITLE: COMPARE TASK PERFORMANCE OF SELF-PACED AND GP PACED 05C/F GRADUATES SCHOOL/AGENCY: USASIGS POC/PHONE: Mr. Squyres 780-7221

1. OBJECTIVE(S)	2. SAMPLE SIZE	3. TEST UNIT(S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/FINAL REPORT DATE
To evaluate effectiveness of the 05C self-paced program.	Part 1 All 05B, 05C, 05F grads 27 Jan-17 Feb 77, Total-224	USASIGS	Based on data gathered pre ARTS.	No field tests	T_I, T_{I_2}	RES to PROF	I-1 Apr F-1 Apr
	Part 2 Selected 05C/F self-paced grads 15 Apr-30 Jun and all 05C/F OSUT grads 1 Jul-15 Sep EST - 150 TOTAL-374	USASIGS	(1) End of crs test. (2) Questionnaire.				I-1 Jul F-15 Sep

COMPARE SELF-PACED AND GROUP-PACED

DELIVERABLE SUMMARY

5 April 1978

	TEST ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
T_I & T_S	1. Administer end of course test prior to field training exercise. 2. Gather academic data (attrition, average number of weeks in training, absenteeism student profiles, attitude.)	Core B: Determine time/costs to achieve proficiency.	Determine most efficient (time & dollars) means of achieving individual proficiency.
T_{S2}			
T_A			
T_{A2}			

10 April 1978

WORKSHEET

TITLE: TEST PROFICIENCY OF 05C/F TEAMS IN FIELD UNITS SCHOOL/AGENCY: ______ POC/PHONE: Mr. Squires 780-7221

1. OBJECTIVES	2. SAMPLE SIZE	3. TEST UNIT (S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/ FINAL REPORT DATE
Compare performance of 05C/F teams in field units who have completed self-paced and lock-step courses.	150 24ID 80 49AD 230 (ARNG)	24ID 49AD (ARNG)	Validated job proficiency test USASIGS SWT questionnaire.	24ID 24-30 Apr 49AD 5-9 Jun 78 12-15 Jun 78	T_I, T_S, T_{S2}, T_A	RES to PROF	I-Mid Jun F-1 Jul

DELIVERABLE SUMMARY

	TEST ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
T_I & T_S	1. Administer written test component. 2. Administer hands-on test component (portion evaluating individual).	Core C: Develop diagnostic tests to measure proficiency and decay levels. Variable 12: Determine exportable training packages to support training. Variable 18: Determine effects of less capable trainees.	1. Compare performance of self-paced and lock step groups. 2. Frequency of retrain. 3. Validate critical tasks.
T_{S2}	1. Administer written test component to self-paced graduates. 2. Administer hands-on test component to self-paced graduates (portion evaluating individual).	Core C: Develop diagnostic tests to measure proficiency and decay levels. Variable 12: Determine exportable training packages to support training. Variable 18: Determine effects of less capable trainees.	
T_A	Administer hands-on test component (portion evaluating RATT team).	Core C: Develop diagnostic tests to measure proficiency and decay levels. Variable 12: Determine exportable training packages to support training. Variable 18: Determine effects of less capable trainees.	
T_{A2}	Administer hands-on component to self-paced graduates (portion evaluating RATT team).	Core C: Develop diagnostic tests to measure proficiency and decay levels. Variable 12: Determine exportable training packages to support training. Variable 18: Determine effects of less capable trainees.	

WORKSHEET

TITLE: COMPARE ALTERNATIVE UNIT TRAINING PROGRAMS SCHOOL/AGENCY: USASIGS POC/PHONE: Mr. Squyres AV 780-7221

1. OBJECTIVES	2. SAMPLE SIZE	3. TEST UNIT (S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/ FINAL REPORT DATE
Compare alternative unit training programs to correct performance deficiencies.	TBD - Dependent on deficiencies found	24ID 49AD (ARNG)	Pretest - validated job proficiency tests & SWT questionnaire Post Test validated job proficiency tests & SWT questionnaire.	Administered after completion of testing performance of O5C/F in field 24ID May-Jun 49AD Mid Jun	T_S, T_{S2}, T_A	RES to PROG to PROF	I-24ID 1 Jul 49AD TBD P-TBD

	TEST ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
T_I / T_S	1. Administer Pre-test. 2. Execute training programs. 3. Administer Post-test.	Core A: Continue validation of threat oriented SM/ARTEPs. Core B: Determine time/costs to achieve proficiency. Variable 12: Determine exportable training packages to support training. Variable 16: Determine effects of stability and turbulence. Variable 19: Evaluate rapid refresher training programs.	1. Validate critical SM/ARTEP tasks. 2. Determine time/cost/frequency for substandard performers to achieve proficiency with selected unit training programs. 3. Measure effect of turbulence on individual and collective proficiency. 4. Determine alternative training packages which will provide time/cost/frequency data for substandard performers to reach proficiency.
T_{S2}	1. Administer Pre-test. 2. Execute training programs. 3. Administer Post-test.	Core A: Continue validation of threat oriented SM/ARTEPs. Core B: Determine time/costs to achieve proficiency. Variable 12: Determine exportable training packages to support training. Variable 16: Determine effects of stability and turbulence. Variable 19: Evaluate rapid refresher training programs.	
T_A	1. Administer Pre-test. 2. Execute training programs. 3. Administer Post-test.	Core A: Continue validation of threat oriented SM/ARTEPs. Core B: Determine time/costs to achieve proficiency. Variable 12: Determine exportable training packages to support training. Variable 16: Determine effects of stability and turbulence. Variable 19: Evaluate rapid refresher training programs.	
T_{A2}			

10 April 1978

WORKSHEET

TITLE: VALIDATION OF RIFLE SQUAD REALTRAIN FOR ENGAGEMENT SIMULATION (REALTRAIN) SCHOOL/AGENCY: ARI POC/PHONE: ARI Dr. Harris 274-8827

1. OBJECTIVES	2. SAMPLE SIZE	3. TEST UNIT (S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/ FINAL REPORT DATE
1. To determine relative effectiveness of REALTRAIN & conventional training for rifle squad tactical training. 2. To provide data on the utility of performance measures, measurement procedures and performance data collection strategies for ARTEP training diagnosis and assesment of unit tactical performance. 3. To provide data for inclusion in cost and training Effectiveness Analysis (CTEA) for Unit Tactical Performance.	PHASE I TNG for data collectors, controllers & OPFOR PHASE II Six Rifle SQDS (3 REALTRAIN/ 3 CONVENTIONAL) formed into two PLT's & tested to establish Baseline PHASE III Six SQDs train (3 REALTRAIN/ 3 CONVENTIONAL) PHASE IV Six SQDs Post Test PHASE V 3 SQDs oppose 3 SQDs PHASE VI Repeat PHASES II & IV	N/A	N/A	11 Apr 77 20 May 77	T_{S2}, T_{A2}	PROG to PROF	I-N/A F-ARI 11-92 dtd Oct 77

10 Apr 78

WORKSHEET

TITLE: VALIDATION OF ANTI-ARMOR REALTRAIN FOR ENGAGEMENT SIMULATION ARTEP SCHOOL/AGENCY: ARI POC/PHONE: ARI DR. Harris, 274-8827

1. OBJECTIVES	2. SAMPLE SIZE	3. TEST UNIT (S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/ FINAL REPORT DATE
1. To determine the relative effectiveness of REALTRAIN and conventional training for Combined Arms Tactical training. 2. To provide data on the utility of performance measures, measurement procedures and performance data collection strategies for ARTEP training diagnosis and assessment of unit tactical performance. 3. To provide data for inclusion in Cost & Training Effectiveness Analysis (CTEA) for tactical engagement simulation systems.	1 TK BN 1 MEC BN 5 FIST	4ID	1. Training Data Questionnaire for individual/unit.	9 Jan-Mar	T_A, T_{A2}	PROG to PROP	I-EST 24 Mar F-EST 15 Jun

DELIVERABLE SUMMARY

	TEST ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
T_I & T_S			1. Determine most efficient (time & dollars) methods for achieving collective proficiency. 2. Determine time/frequency/cost/ proficiency as a function of less capable trainees.
T_{S2}			
T_A	1. Train-up of participating units. 2. Pretest to establish baseline proficiency. 3. Two teams receive conventional tactical training. 4. Post test to quantify effect of training. 5. Free play exercise opposing REALTRAIN Force 6. Repeat Pre & Post tests.	Core A: Continue validation of threat oriented SM/ARTEPs. Core B: Determine time/costs to achieve proficiency. Core C: Develop diagnostic tests to measure proficiency and decay levels. Core D: Determine decay rates and frequency of required retraining.	
T_{A2}	1. Two teams receive tactical training w/ REALTRAIN. 2. Post test to quantify effect of training. 3. Fill play exercise opposing conventional force. 4. Repeat Pre & Post tests.	Core B: Determine time/costs to achieve proficiency. Core C: Develop diagnostic tests to measure proficiency and decay levels. Core D: Determine decay rates and frequency of required retraining. Variable 18: Determine effects of less capable trainees. Variable 20: Develop training concepts to proficiency with reduced resources. Variable 25: Validate the effectiveness and efficiency of training devices.	

10 Apr 78

WORKSHEET

TITLE: COMPUTER ASSISTED MAP MANEUVER (CAMMS) SCHOOL/AGENCY: CAC/CATRADA/ARI POC/PHONE: CATRADA DR. H. Barber AV 552-4443, LTC Shambarger AV 552-3180/3395

1. OBJECTIVES	2. SAMPLE SIZE	3. TEST UNIT (S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/ FINAL REPORT DATE
1. Measure effectiveness of CAMMS as a training method. 2. Develop a command group performance assessment procedure & feedback mechanism.	5 BN sized command groups initially	3 BNs, 4ID by 15 May 2 BN 1ID by 15 May	1. CMD Gp/staff module ARTEP 71-2. 2. Pre-test & Post Test design.	1. Warm-up 2. Pre-test 3. Feedback, train, feedback 4. Post test 10 Apr-28 Apr 3BN 4ID (2 MECH, 1ARM) 1ID TBD	CMD GP/ contribution to unit readiness	PROG to PROF	I-NONE Testing complete for short term effort by 15 May F-1 Jul 78
3. Relate unit training proficiency to the type and amount of performance improvement by command group through use of CAMMS. (Long term ARTS objective which is tied to evaluation of unit at NTC).	10 BN sized command groups annually (50% AC/ 50% RC)		3. Performance measurement plan.				
4. Determine effects of stability/turbulence on collective proficiencies. (Long term objective tied to evaluation of unit at NTC).							

	ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
T_1 & T_S	1. Conduct warm-up exercise. 2. Conduct pre-test. 3. Conduct CAMMS training w/pre/post-test.	Core A: Continue validation of threat oriented SM/ARTEPs. Core B: Determine time/costs to achieve proficiency. Core C: Develop diagnostic tests to measure proficiency and decay levels. Variable 16: Determine effects of stability and turbulence. Variable 19: Evaluate rapid refresher training programs.	1. Gather insights as to effectiveness and efficiency (time & dollars) of training battalion command groups. 2. Assess effectiveness of CAMMS as an evaluation tool.
T_{S2}		Variable 20: Develop training concepts to proficiency with reduced resources. Variable 25: Validate the effectiveness and efficiency of training devices. (Continued from above)	
T_A			
T_{A2}	LONG RANGE FOLLOW-UP 1. Conduct Bn engagement simulations at NTC/CDEC against OPFOR. 2. Compare results of performance measures of CMD GP proficiency of CAMMS trained vs conventional trained CMD GPs.	Core D: Determine decay rates and frequency of required retraining. Variable 17: Determine effects of reduced off/NCO fill. Variable 16: Determine effects of stability and turbulence.	

10 Apr 78

WORKSHEET

TITLE: TRAINING INSTRUMENTATION EVALUATION (TIE TEST) SCHOOL/AGENCY: TRADOC-DCST/CDEC POC/PHONE: CATRADA MAJ Ballagh 552-4684 USACDEC AV 929-3475

1. OBJECTIVES	2. SAMPLE SIZE	3. TEST UNIT (S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/ FINAL REPORT DATE
1. To gain insights into changes in tactical proficiency resulting from instrumented tactical engagement training.	PHASE I: One Armor Hvy Co TM against OPPOR	CDEC 1ID	NONE	PHASE I 31 Jul, 26 Aug	T_S, T_A	PROG to PROF	I-N/A F-EST 15 Dec
2. To verify/revise tactical MOE.	PHASE II: One Armor Hvy Co TM against OPPOR			PHASE II 1 Sep, 15 Sep			
3. To provide information as to instrumentation required to provide feedback/ diagnostics needed to improve performance.							
4. To provide data to assist development of a MILES control system & the NTC.							

	TEST ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
T_I & T_S	1. Conduct Phase I SM train-up.	Variable 17: Determine effects of reduced off/NCO fill.	1. Determine time/frequency and cost of training of less capable trainees. 2. Provide time and cost of achieving crew proficiency. 3. Determine effect of turbulence on crew proficiency. 4. Determine frequency of retrain and method of maintaining proficiency.
T_{S2}	1. Conduct Phase I ARTEP level 1 train-up.	Core B: Determine time/costs to achieve proficiency. Variable 16: Determine effects of stability and turbulence.	
T_A	2. Conduct Phase I engagement simulation. 3. Conduct Phase II engagement simulation.	Core A: Continue validation of threat oriented SM/ARTEPs. Core B: Determine time/costs to achieve proficiency. Extract Core C, Collective learning decay by comparing performance w/train-up phase. Variable 25: Validate the effectiveness and efficiency of training devices.	
T_{A2}			

10 Apr 78

WORKSHEET

TITLE: ARI CANNON CREW TURBULENCE SCHOOL/AGENCY: ARI/USAFAS FT SILL POC/PHONE: DR. Steve Goldberg, 284 8694 CPT Patrick, USAFAS, 639-4393

1. OBJECTIVES	2. SAMPLE SIZE	3. TEST UNIT (S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/ FINAL REPORT DATE
1. To measure the proficiency of cannon crews as a function of: time together, individual proficiency by position and training history of crew members.	1. Validation, 8 M102 crews 2. 2 FA battalions (36 sections)	1. III Corps Arty. 2. 9ID	Crew turbulence questionnaire.	1. Validation trial 17, Mar, Ft Sill, OK. 2. Ft Lewis, Aug 78	T_A, T_S	PROG to PROF Effect of turbulence	I-TBD F-TBD

DELIVERABLE SUMMARY

	TEST ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
T_I & T_S	1. Individual Proficiency Test of Critical Pers. 2. Administer FA crew stability questionnaire to ea FA crewman.	Core C: Diagnostic tests to measure proficiency and decay levels. Variable 16: Determine effects of stability and turbulence.	1. Determine individual and crew proficiency. 2. Impact of turbulence on crew proficiency.
T_{S2}			
T_A	FA Cannon Section Proficiency Test.	Core C: Diagnostic tests to measure proficiency and decay levels. Variable 16: Determine effects of stability and turbulence.	
T_{AZ}			

10 Apr 78

WORKSHEET

TITLE: TAC FIRE POST OTIII (TEA 85) SCHOOL/AGENCY: USAFAS FT SILL/ ARI FT HOOD POC/PHONE: DR. Sanders, ARI, Ft Hood, AV 737-1316/9118 LTC John Neal 639-3518/5903

1. OBJECTIVES	2. SAMPLE SIZE	3. TEST UNIT (S)	4. DATA COLLECTION PLAN*	5. FIELD TEST DATES/ ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/ FINAL REPORT DATE
1. Continue to develop diagnostic tests to measure individual/collective earning decay levels.	22 troops (1 TACFIRE set w/ crew)	1 CAV	Attitude surveys	Train-up class graduates 17 Apr	T_I, T_S	PROG/PROP	I-Jul F-TBD
2. Determine decay rates and freq of retraining required to sustain optimal prof for individual/collective critical tasks.						PROG/PROP	

	TEST ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
T_I & T_S	1. Individual Proficiency Test of Critical Pers at 15, 30, 45, and 60 days. 2. Administer TACFIRE crew stability questionnaire to ea TACFIRE crewman.	Core C: Develop diagnostic tests to measure proficiency and decay levels. Variable 16: Determine effects of stability and turbulence.	1. Allows most efficient (time & dollars) costing of TACFIRE training to proficiency. 2. Determine frequency of retrain to sustain proficiency.
T_{S2}	1. Individual Proficiency Test of Critical Pers at 15, 30, 45, and 60 days. 2. Administer TACFIRE crew stability questionnaire to ea TACFIRE crewman.	Core C: Develop diagnostic tests to measure proficiency and decay levels. Variable 16: Determine effects of stability and turbulence.	
T_A			
T_{A2}			

10 April 1978

WORKSHEET

LTC J. Neal, AV 639-3518
Dr. J. Schields, AV 284-8694

TITLE: RETENTION & PROFICIENCY TESTS ON COMMON AIT SKILLS SCHOOL/AGENCY: USAFAS/ARI POC/PHONE:

1. OBJECTIVES	2. SAMPLE SIZE	3. TEST UNIT (S)	4. DATA COLLECTION PLAN	5. FIELD TEST DATES/ ACTIVITIES	6. ARTS AREA OF INTEREST	7. LINKS TO ARTS MODEL	8. INTERIM/ FINAL REPORT DATE
To determine the retention and proficiency level of soldiers on common AIT skills.	500 troops	III Corps Arty	ARI Questionnaires	Ft Sill, OK, Apr - May	T_I, T_S	PROG to PROF	I-1 Jul F-TBD

	TEST ACTIVITY	INTERFACE W/TEA '85 CORE/VARIABLES	INTERFACE W/BATTALION TRAINING MODEL
T_I T_S	1. Measure proficiency attained on selected common tasks in AIT. 2. Measure retention of proficiency on selected common tasks after some period of time in unit.	Core A: Continue validation of threat oriented SM/ARTEPs. Core C: Develop diagnostic tests to measure proficiency and decay levels. Core D: Determine decay rates and frequency of required retraining. Variable 3: Determine allocation of tasks between institution/unit.	1. Validate selected tasks in critical functional areas. 2. Determine frequencies of retrain under various training methods.
T_{S2}			
T_A			
T_{A2}			

GUIDELINES FOR PREPARATION

of

SYSTEM WORK TEAM REPORTS

PREFACE

Introduction	This workbook was prepared by the Army Training Study Group (ARTS) to guide and facilitate the preparation of interim and final reports of the Systems Work Teams (SWT). Additionally, this workbook should guide the preparation of reports of other studies which ARTS intends to integrate into its Training Effectiveness Analysis for 1978 (TEA 78).
Situation	ARTS must be prepared to quickly and accurately assemble and synthesize numerous reports from SWT as well as other "piggybacked" studies and tests. While each individual study or test has great value, there will be even greater value in assembling results in various combinations. This demands that reports follow a common format as much as possible.
Strategy	To quickly and accurately assemble pieces of individual reports into new combinations requires that reports follow certain format and design characteristics. Basically, these are: - individual tests be reported in a modular format so they can be extracted for use in other combinations. - significant data elements from within individual tests also be reported in modular format, again so that they can be extracted in the same way. - tests and data elements be coded to show their relationship to the ARTS model and the "essential elements of analysis" (EEA).

Comment	As stated above, this workbook is intended to facilitate the preparation of test reports. Inevitably there will be test information that will not fit this format. In this case, ARTS will be standing by to work out impromptu solutions with the test proponent agency.

CONTENTS

Outlining the Report....................1

Proposed Outlines.......................2

Modularizing Reports....................4

Identification Coding of Modules......6

Coding Model............................9

Module Cover Sheet.....................10

Putting It All Together................17

OUTLINING THE REPORT

Discussion

Most published reports describe the outcome of a single test. As such, the common format of the contents is:

I Abstract or Summary
- Problem
- Method or Test Design
- Findings or Results
- Conclusions

II Introduction
- Objective
- Hypothesis

III Method or Test Design
- Experimental Design
- Subjects
- Apparatus
- Procedure

IV Findings or Results

V Discussion

VI Conclusion

Appendices

Figures or Tables

Problem

While the outline above is logical for the presentation of a single test, most SWT are conducting and reporting on several tests. The outline above would, if used to report on mulitiple tests, cause the reader to page back and forth between sections to follow any one test.

Proposed Outlines

Since some contributors to TEA 78 are involved with single tests while others are involved with multiple tests, ARTS proposes the following two outlines:

<u>SINGLE TEST OUTLINE</u>

I Abstract
- Problem
- Test Design
- Findings
- Conclusions

II Introduction
- Objective(s)
- Hypothesis*

III Test Design
- Experimental Design
- Subjects
- Apparatus*
- Procedure

IV Findings

V Discussion

VI Conclusion(s)

Appendices

Figures or Tables

<u>MULTIPLE TEST OUTLINE</u>

I Abstract
- Problem
- Test Design
- Findings
- Conclusions

II Tests and Results

Test #1
- Objective(s)
- Hypothesis*
- Experimental Design
- Subjects
- Apparatus*
- Procedure
- Findings
- Discussion (of this indiv test)
- Conclusions (about this indiv test)

Test #2 (etc.)
(Repeat as required)

III Discussion (of combined test results)

IV Conclusions (about combined test results)

Appendices

Figures or Tables

NOTE: Asterisked items are optional

Comment

The two proposed outlines for reporting single or multiple test results provide a general structure. However, ARTS strategy is to have the test reports modularized and coded. Therefore the subjects of modularizing and coding will be discussed next. Later the discussion will return to how modules will integrate into the proposed general outlines.

MODULARIZING REPORTS

Introduction	Modularizing the report means segregating and publishing in blocks of information that can be extracted and stand alone. This modularizing will be done on two levels, separate tests and data elements.
Definitions	Separate test- a test that addresses an SWT objective or an ARTS EEA. Data element- a part of a test that has the potential to be combined with other SWT tests or data elements to produce useful insights or the basis for broader generalizations.
Examples	Separate test- USAIS is conducting a separate test when it compares institutional versus unit TOW training. Data element- Within the example of a separate test given above, USAIS may gather information about training threat vehicle identification. This information would be a data element of great potential usefulness to other users.
Comment	ARTS recognizes that the definition of data elements is imprecise. If possible, the definition will be tightened up before report writing begins. For the moment, the intent in modularizing data elements is to make available, in extractable format, the small pieces of information that may have utility to others and in other combinations. When in doubt, call it a element and modularize it.

Summarizing

ARTS proposes that each separate test or data element from within a test be reported in a stand-alone module. Therefore, tests and data elements should be published in consecutive pages which can be extracted intact. Each new module should begin on a new page so pages would not have to be cut apart.

Some Rules

Rule #1 - If in doubt, call it a data element.

Rule #2 - Publish modules on consecutive pages.

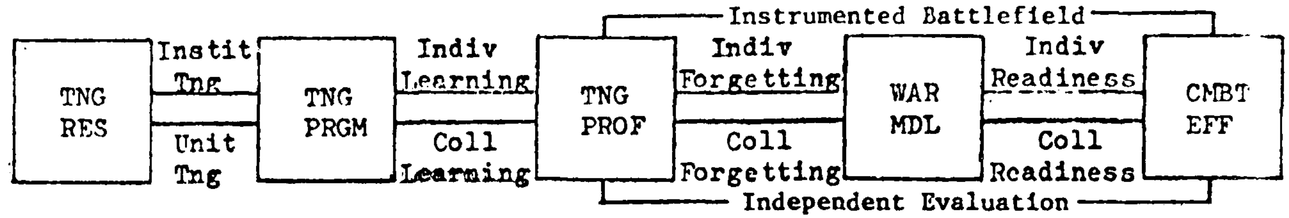
Rule #3 - Always start a module on a new page.

IDENTIFICATION CODING OF MODULES

Introduction	To facilitate rapid and accurate identification of both separate test and data element modules, ARTS proposes an identicarion code for each module. The purpose of the code is to show now the module relates to; - the ARTS model - the ARTS objectives, EEA and situational variables
Explanation	As you know, to structure efforts toward its objective of relating resources to combat effectiveness, ARTS originally developed the following model; TNG RES ▶ TNG PROGS ▶ TNG PROF ▶ WAR MODELS ▶ COMBAT EFFECTIVENESS Each test has a specific scope with relation to the model, that is, each has an <u>origin</u> and a <u>destination</u> in the model. For example, some tests encompass <u>TRAINING RESOURCES</u> to TRAINING PROFICIENCY. Other tests encompass the entire model, TRAINING RESOURCES to COMBAT EFFECTIVENESS.
Path Through the Model	Additionally, there are paths through the model. Modules must indicate not only the point of origin and destination but the <u>path within the model</u> as well.

Paths Through ARTS Model

There are two or more bridges between each block of the ARTS model. They are;



Paths Within the Blocks

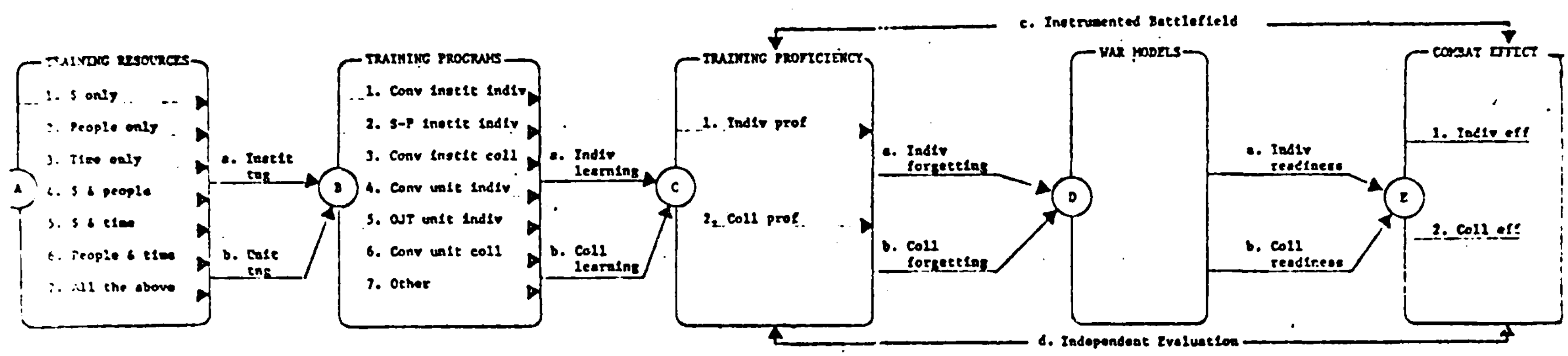
Additionally, there are paths within the blocks of the model. Considering the blocks one at a time;

TRAINING RESOURCES
- Dollars only
- People only
- Time only
- Dollars and people
- Dollars and time
- People and time
- All of above

TRAINING PROGRAMS
- Conventional institutional instruction for individuals
- Self-paced institutional instruction for individuals
- Conventional institutional instruction for collective
- Conventional unit training for individuals
- OJT in units for individuals
- Conventional unit training for collective
- Other

Paths Within the Blocks (continued)	TRAINING PROFICIENCY Individual proficiency Collective proficiency **WAR MODELS (Internal paths not applicable to SWT)** COMBAT EFFECTIVENESS Individual effectiveness Collective effectiveness
Combining Block and Bridge Paths	Summarizing, there are either two or seven paths through any block of the ARTS model (excluding the war models block). Further, there are two or more separate bridges between each block. By assigning a single letter or numeral to each possible leg of the overall path a basis is formed for a shorthand code.
Path Coding Model	On the following page, the ARTS model is expanded to show all possible paths. Further, each segment of the path has an individual identifying code letter or number. They follow this pattern; - All blocks are identified by a single capital letter. - All paths through a block are identified by a single number. - All bridges between blocks are identified with a lower case letter.

CODING MODEL



MODULE COVER SHEET

Introduction

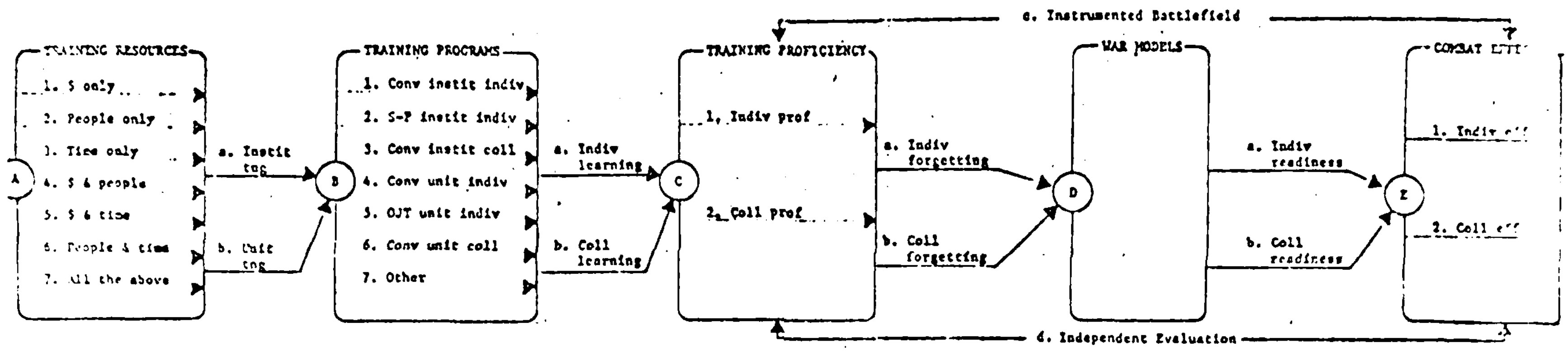
ARTS has designed a Module Cover Sheet to be placed on top of each module, whether the module be of a separate test or data element. The cover sheet is intended to facilitate the indication of the relationship of each module to;

- the ARTS model
- the ARTS objectives, EEA and situational variables

The Module Cover Sheet is shown on the next page.

MODULE COVER SHEET

Test Number_____ Data Element Number ___ Title ______________________ System ___ Date _________



OBJECTIVES AND EEA

_____A. Continue validation of threat oriented <u>critical</u> SM/ARTEP tasks, conditions, standards.

_____1. Are SM tasks/ARTEP events based on the documented results of appropriate front-end analysis techniques?

_____2. Are ARTEP events supported with prerequisite SM tasks?

_____3. Was performance of SM/ARTEP task actually necessary for the accomplishment of a specific mission? i.e., was it truly a critical task?

_____4. Is the specific level of proficiency greater than, equal to, or less than that required to meet the threat?

_____B. Determine time/costs to achieve optional proficiency for critical individual/collective tasks.

_____1. What resources are required in the institution?
a. Dollars d. Dollars & people g. $, P & T
b. People e. $ & T
c. Time f. P & T

_____2. What are resources required in the unit?
a -- g as above.

_____3. Does the collected data reflect deviation from real-world normalcy, i.e., validity of trainee/instructor, NCO/officer fill, unusual environmental constraints or advantages?

_____C. Continue to develop diagnostic tests to measure individual/collective learning decay levels.

_____1. Do current diagnostic tests account for learning/decay which occurs subsequent to course/period of instruction? (i.e., learning which occurs/decays during situational dependent performance of duty.)

_____2. Does the diagnostic test program provide for testing at two or more data points? i.e., 30, 60 & 180 days after training?

_____3. Do diagnostic tests provide data to determine specific skill/proficiency has loss and retraining to proficiency required? (i.e., makes the corrective action obvious).

_____4. What is the training resource requirement to reacquire mastery after various intervals subsequent to the original training program? (Note: All training activity, or lack thereof, must be considered.)

_____D. Determine decay rates and frequency of retraining to sustain optimal proficiency for individual/collective critical tasks (time/costs).

_____1. What is the time to initially learn a skill to mastery?

_____2. After specified intervals without practice what is the time required to relearn a skill to mastery?

_____3. Within task performance, which elements are forgotten first?

_____4. What is the frequency of retraining or practice necessary to ensure retention of acceptable levels of proficiency?

SITUATIONAL VARIABLES

_______ 1. Reduce length of selected courses for high density/low tech MOS's vs. low density/high tech MOS's.

_______ 2. Resources/effect of tng common vs. technical skills only in institutions.

_______ 3. Optimal alloc of tng tasks between institution/unit.

_______ 4. Validate selected critical tasks for service school development of how to train to combat proficiency at least cost in a unit.

_______ 5. Impact of transfer of selected AIT to FORSCOM.

_______ 6. Impact of transfer of BT to FORSCOM.

_______ 7. Impact of transferring all entry level tng to FORSCOM.

_______ 8. Impact of transfer of all except critical task tng to FORSCOM.

_______ 9. Impact of transfer of all except high-tech task tng

_______ 10. Effect of expanded BT to develop cross-tng in spt MOS.

_______ 11. Effect of expanded OSUT for selected high-pri weapons.

_______ 12. Determine exportable/job tng packages required to spt tng in units.

_______ 13. Determine tng packages to assure supervisor competence

_______ 14. Determine MOS transition tng on proficiency on new equipment/job.

_______ 15. Determine resources required to attain unit collective proficiency (T_A).

_______ 16. Effects of personnel stability/turbulence of individual/collective proficiency.

_______ 17. Determine effects of reduced officer/NCO fill on collective/individual tng.

_______ 18. Effects of introducing less capable personnel into the tng base and units.

_______ 19. Evaluation of rapid refresher tng programs for Reserve Component units.

_______ 20. Develop tng concepts to individual/collective proficiency with reduced resources.

_______ 21. Develop replacement (D+30 to D+180) unit upgrade tng programs.

_______ 22. Determine tng required to exploit the enhanced capability designed into modernized equipment.

_______ 23. Determine optimal use of equipment pools to support AC/RC tng.

_______ 24. Develop tng programs to assimilate new equip in units.

_______ 25. Validate effectiveness and efficiency of tng devices.

_______ 26. Develop tng programs to conduct continuous combat.

Completing the Top Line

Instructions for entries in the top line are as follows;

Test Number - number separate tests sequentially in the order they are presented in the report. If the cover sheet is for a data element module leave this item blank.

Data Element Number - number data elements sequentially in the order they are presented in the report. If the cover sheet is for a separate test leave this item blank.

Title - enter the title of the test or data element of your own choosing.

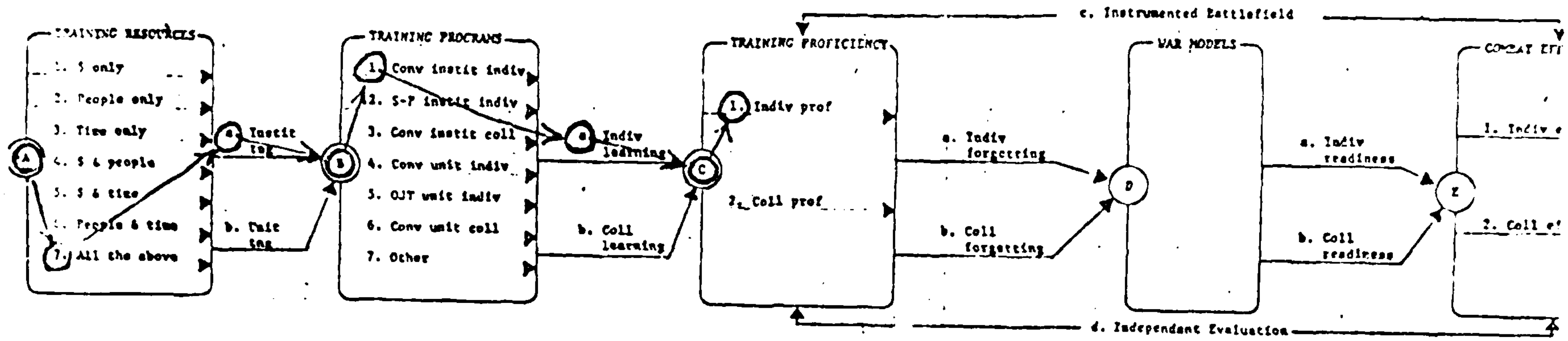
System - enter the equipment or MOS abbreviation, i.e., M60, TOW, 05C etc.

Date - enter date of the report.

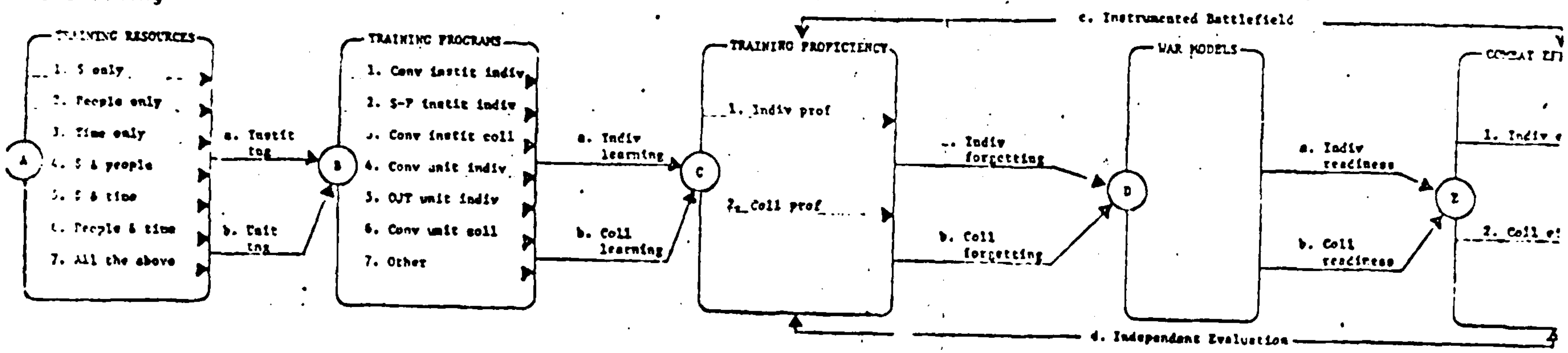
Path Through Module

The Coding Model is reproduced on the cover sheet so users can "draw" the point of origin, path and destination. This can be done with an overlining pen or by circles and arrows as displayed on the next page.

Circles and Arrows -

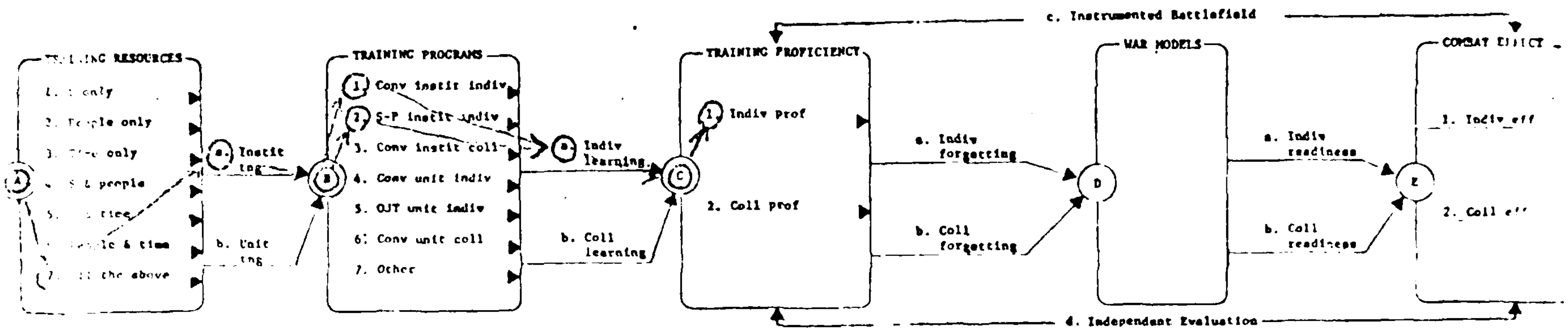


Overlining -



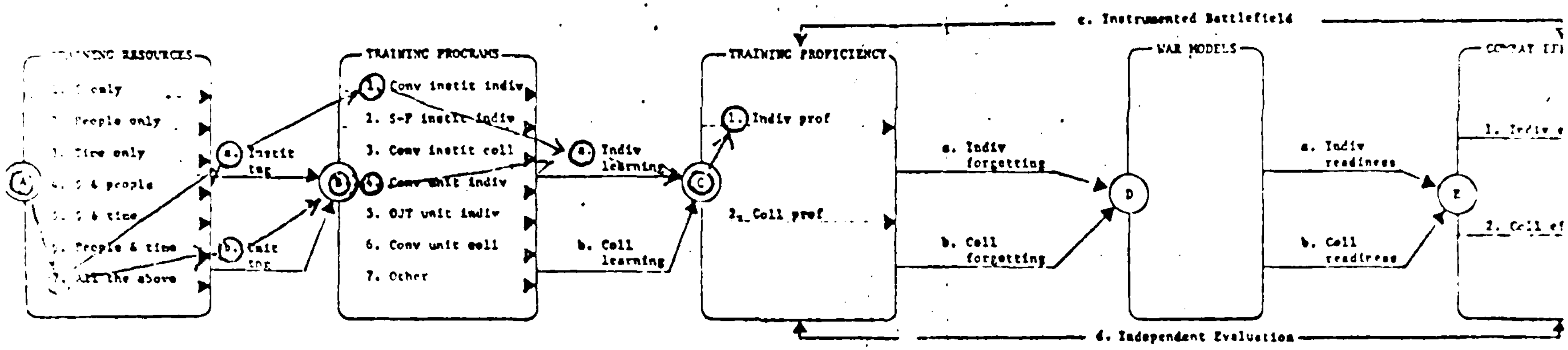
Dual Paths

Some tests either compare paths or deliberately encompass parallel paths. To show this, simply overline or mark both paths. For example, if a school is comparing conventional with self-paced courses overline both paths as shown below;



Looping Through Model

If a test encompasses both institutional and unit training programs in effect it is looping back through the Model. For example, if an SWT is measuring individual proficiency of AIT graduates who have also had conventional unit individual training, and assuming all resource costs were known the path would loop like this;



ARTS Objective EEA, and Variables — The bottom half and the reverse side of the cover sheet lists the ARTS objectives, the EEA and situational variables. They collectively constitute a distillation and refinement of the original Study Directive EEA and the TEA 85 core objectives and situational variables as they are now envisioned by ARTS to apply to TEA 78.

Instructions — In the space provided check all objectives, EEA and variables that the module relates to either <u>directly</u> or <u>indirectly</u>.

PUTTING IT ALL TOGETHER

Assembling the Report — Refering back to the two proposed outlines on page 2, in each case a Module Cover Sheet for a test is inserted at the beginning of Section II. In the case of the Multiple Test Outline, there would be a cover sheet on each separate test.

Data Element Modules — All data element modules will be placed in the report as Appendix A. Again, each data element module would have a cover sheet.

Problems? — If problems are encountered using these instructions for preparing reports call ARTS, Autovon 354-1461

9 April 1978

ARTS TRAINING RESOURCE METHODOLOGY

1. PURPOSE

Provide SWT guidance for collecting data for the development of relationships between resources and training conducted both in the institution and in the unit.

2. GROUND RULES

A. Training resources are time, personnel, and dollar (FY78) costs.

B. In SWT investigations which involve a comparison of training alternatives the status quo will be included as one of the alternatives in order to establish a baseline. One time cost and/or savings associated with an investigation of alternative unit training strategies will be identified.

C. T_I resource requirements will be provided to SWT by HQ TRADOC (DCSRM) using the methodology contained in TRADOC Reg 11-5 and associated cost analysis studies of ATCs and schools. SWT input requirements to HQ TRADOC for costing alternative T_I programs are at TAB A.

D. FORSCOM/DWT in coordination with SWT is requested to determine the resource impact on unit training as a result of any transfer of institutional training to unit training using T_S/T_A ARTS resource methodology (ATRM).

E. Resource data collected for ARTS should reflect the training resource requirements for the training program(s) (or

portions thereof) which are being investigated by ARTS with respect to training proficiency. For example, if a specific portion of a tank crew training program is being evaluated with respect to a pertinent measure of crew proficiency, resource data collected should reflect the cost of that portion of training a tank crew rather than the cost of the complete program for training a tank crew. The cost of the complete program for training a tank crew would be relevant, however, if the entire program was being reviewed with respect to the overall proficiency of a tank crew.

3. METHODOLOGY

A. SWT are responsible for determining which investigations of training programs (or portions thereof) under their review will be supported with training resource requirements data. Although the level of resolution of relating resources to training is dictated by the particular insights being sought by a SWT, the maximum levels of aggregation of data are:

(1) T_I by course graduate.

(2) Total T_{S1} by MOS and skill level per soldier.

(3) Total T_{S2} by MOS and skill level per soldier.

(4) Total T_{A1} by separate unit level, i.e., crew/squad/section, platoon, company, and battalion.

(5) Total T_{A2} by separate unit level. Formats for the display of the T_I, T_S, and T_A resource data are at TAB's B, C, and D respectively. T_{S1} and T_{S2} use a common format as does T_{A1} and T_{A2}. It is acknowledged that some SWT

investigations will require resource data to be collected for only a portion or segment of T_{S1}, T_{A1}, etc. The tank crew example in paragraph 2F illustrates this point for T_A while the examples given in the next paragraph illustrate different portions of T_S for which resources may be collected.

B. The total individual training program in a unit for a particular MOS & skill level may be divided and subdivided into meaningful subsets of training programs which are mutually exclusive and totally exhaustive. T_{S1} may be addressed in any of a number of ways depending upon the intended use of the data.

(1) All formally scheduled instruction (Total T_{S1} or TT_{S1}) includes Soldier's Manual (SM) tasks, as well as non-SM-tasks instruction which is required for the development of a "whole soldier." Human relations and defensive driving are examples of non-SM-task instruction.

(2) Divide Total T_{S1} into two subsets; all instruction on SM tasks (SM T_{S1}, and remaining instruction devoted to non-SM-task instruction (NSM T_{S1}).

(3) Subdivide SM T_{S1} into subsets so that each subset addresses a relevant grouping of SM tasks. Relevant groupings of SM tasks for 11B10 would be those grouped in FM7-11B1 by Section (e.g., Battlefield Survival, Combat Techniques, etc.) or by Subsection (Subsections within the Combat Techniques Section address Basic Individual Techniques, Land Navigation, Communications, etc.) or by....The subdivision may continue to the

point that a multiple subdivision of T_{S1} is addressing training relating to one sub-task of a specific SM task. The point being, data should be collected which reflects (defines) only that particular training which contributed to the proficiency being measured.

C. The treatment of time with respect to the categories of training is as follows:

(1) The time available for a unit to conduct formally scheduled training is recognized as a constraint. For the purpose of this analysis, this constraint is set at 1848 hours (48 weeks x 5 day/week x 8 hours/day - 9 holidays x 8 hours/day). This 1848 hours is distributed between T_{S1}, T_{A1}, T_{A2}, and T_N. T_N is the time devoted to non-training activities such as guard, detail, training support, demonstrations, etc., all of which compete for a chunk of the 1848 hours.

(2) T_{S2} does not compete for any of the 1848 hours as it is training conducted at times other than when training is formally scheduled. T_{S2} may be after duty hours time or slack time during normal duty hours, and therefore, is viewed as bonus time achieved through motivation or training efficiencies. Although T_{S2} is not competing for any of the 1848 hours, the hours expended must be accounted for in order to provide insights on TT_S. Dollar costs are attributed to T_{S2} only for the unique training support material required exclusively for T_{S2}. Guidance on assigning costs to such materials will be provided on a case-by-case basis as SWT identify the unique

training materials in the course of their investigations.

(3) E is considered to be restricted to individual unit training conducted during time formally allocated to T_A; and therefore, it is addressed in the same manner as outlined above for T_{S2}. It is acknowledged that training on particular individual tasks may be formally transferred from T_{S1} to E, and thus, this training efficiency frees a given number of T_{S1} hours for reallocation to other T_{S1} training or for reallocation to T_A. An example of a T_{S1} training event which may be formally transferred to E is the preparation of range cards by tank gunners.

D. The collection of resource data for T_{S1} and E for a given MOS and skill level is based upon the TT_{S1}, SM T_{S1} or subsets of SM T_{S1} training programs to be investigated. Data for T_{A1} are collected based upon the particular unit level (crew, platoon, etc.) program or particular portion of a unit level program to be investigated. SWT have lead responsibility of identifying the detailed content and "calendar time period" of the specific T_{S1} and E program (or portions thereof) as well as the T_{A1} and T_{A2} programs for which resource data are to be collected. Requests for assistance available from ARTS Consultant Groups, HQ TRADOC, HQ FORSCOM, HQ USAREUR, and DWT should be made through the ARTS resource point of contact, LTC Michael J. Hatcher, AV 354-1461.

(1) A unit will have a given unit training program for each MOS by skill level which will formally allocate a specific

number of the 1848 hours available to the soldier with that given MOS and skill level. The program is different for the 11B and 11E, as well as, for the 11E10 and the 11E20. Each unique program (e.g., 11E20) will consist of scheduled training which must be identified as SM T_{S1}, or NSM T_{S1}. A highly structured unit training program may even have individual training scheduled during a time period scheduled primarily for T_{A1}. Such individual training must be identified as E. Additionally, one can conceive of a unit having separate collective training programs for each level of collective training (crew, platoon, company, etc.). An example of a portion of a hypothetical training program is at TAB E. Such detailed programs do not exist in units; however, SWT need to construct such a tool for an aid to its analysis. The level of detail of the program constructed by the SWT is dictated by the investigations to be made. The ID#/Task shown on TAB E relates to the ID#/Tasks which appear in the 11E Soldier's Manual and the Mech Inf/Tank Task Force ARTEP. The assigned training categories segregate training events for the purpose of data collection. The training events within a given category should be grouped depending upon the particular investigation a SWT plans to make. (See Paragraph 3B).

E. The basic building blocks for the collection of training program data are the specific training events identified within the training program as illustrated at TAB E. The data for separate events may be aggregated to reflect the total

requirements for that portion of the training program for which proficiency is to be measured. The resource sensitive data elements to be addressed for each training event are:

(1) Equipment usage by type (M151, M113, etc.) to include miles, hours, or rounds.

(2) Ammunition requirements by number of rounds by DODIC.

(3) Number of trainees by grade.

(4) Number of trainers by grade who physically conduct the training.

(5) Amount of trainee time and trainer time allocated to the training. Trainer time includes preparation, instruction, and evaluation.

(6) TDY (EOE 2100) and transportation (EOE 2200) requirements for trainees and trainers.

(7) Training aids/devices utilized.

(8) Training materials and special supplies consumed.

F. An example format for collecting the resource data associated with a particular training event is at TAB F. The example uses ID#/Task 6-12, Tank Platoon Battle Run as shown on the hypothetical training program at TAB E. As an assistance in preparing a training event resource data collection worksheet, listings of vehicles, weapons, other equipment, and ammunition associated with combat and combat support battalions is provided at TAB G.

G. The procedures for deriving the dollar costs of a training event are shown at Inclosure 1 to TAB F, continuing

with the Tank Platoon Battle Run example as a vehicle. The format for the costing procedures is keyed to the training resource data display sheets (TAB's B, C, and D). The cost factors necessary for estimating costs of training are at the following TAB's: TAB H, *Military Personnel and* Allowances; TAB I, Vehicle Usage; TAB J, Weapon Usage; TAB K, Other Equipment; TAB L, Ammunition; and TAB M, Listing of MACOM Wide Cost Factors for Program 2 Mission (Fixed), Program 2 Base Ops (Variable), and Program 2 Base Ops (Fixed). Additionally, guidance for locally developing the man hours associated with the Battalion Training Management Personnel is included at TAB N.

4. ADDITIONAL GUIDANCE

The above guidance should cover most situations; however, additional guidance is available from your ARTS Resource POC, AV 354-1461.

SWT Input Requirements Required for Costing Alternatives T_I Programs

1. Course title and number.

2. Name of installations at which the course is taught and any changes to be addressed under the alternative.

3. Current length of course expressed in weeks and days, e.g., 5 weeks and 2 days and any change to course length.

4. Any changes to types of instruction (e.g., lecture, PE, self-paced) included in the alternative courses.

5. Ammunition requirements by quantity and DODIC for the status quo and alternatives.

6. Changes in tng aids/devices, quantity by item (e.g., Bessler Cue See, TV).

7. Revised instructor contact hours.

8. Frequency of classes per year, status quo and alternative.

9. Changes in average grade of instructors.

10. Changes in average grade of students.

11. Changes in school troop requirements expressed in additions or decrements of man days of support.

12. Any changes in training overhead, e.g., school brigade, office of Director Training Developments.

13. Changes in requirements for equipment purchased with Procurement dollars.

14. Any one time costs by OMA/MCA for the modification or construction of facilities.

15. Identify additional facilities which are required by a proposed T_I Program to include the source of those facilities.

16. Identify facilities which under a proposed T_I program will become available for an alternative use.

TAB A

COURSE TITLE:

COURSE NUMBER/MOS:

DOLLARS (FY78)	OMA	MAP	PA
Variable			
Program 8 Mission			
Instructional Dept			
Other			
Program 8 TOE Spt			
Ammunition			
Pay & Allowances			
Students			
All others			
Travel Pay to Course			
Per Diem at Course			
Program 8 Base Ops			
Support Cost (Tng Aids)	______	______	______
TOTAL:			
Fixed			
Program 8 Mission			
Program 8 Base Ops			
Program 8 TOE Spt			
Support Costs (Tng Aids)	______	______	______
TOTAL:			
TOTAL VARIABLE & FIXED	______	______	______

TIME/PERSONNEL:

Student Course Length ____________________

Direct Man weeks of effort of

Instructional Depts & School Overhead. Civ________ Mil________

TAB

T_S* RESOURCE REQUIREMENTS

MOS & Skill Level: __________

Authorized Grade: __________

Average Pay Grade of Personnel Assigned to MOS & Skill Level: __________

Level of Resolution of T_S*. (e.g., TTS_1, - SM TS_1 - Combat Tech - Basic Ind Tech, SM ID#/TASK, etc. (See para 3D)

DOLLARS (FY78)	OMA	MPA	PA	TOTAL
Variable				
Program 2 Mission (Equipment usage)				
Ammunition				
Pay & Allowances				
TDY/Transportation				
Program 2 Base Ops				
Training Aids/Devices				
Training Materials & Special Supplies Consumed	____	____	____	____
Fixed				
Program 2 Mission				
Program 2 Base Ops	____	____	____	____
TOTAL:				
TOTAL VARIABLE & FIXED:				

TIME/PERSONNEL

"Calendar time period" over which this training is conducted. (e.g., 1 yr, 1 qtr)

Trainee time consumed on this training. (e.g., 45 hrs)

Manweeks** of direct effort required to Spt this training. __________

Identification of unit from which data was collected __________

* Indicate T_{S1} or T_{S2}.

** Also may be expressed as man hours or man months, which ever is most meaningful for the particular situation.

TAB C

T_A* RESOURCE REQUIREMENTS

UNIT LEVEL: (Crew, squad, section, platoon, company or battalion)

TRAINING ID#/TASK: (Relate to ARTEP ID#/TASK)

DOLLARS (FY78)	OMA	MPA	PA	TOTAL
Variable				
Program 2 mission (Equipment usage)				
Ammunition				
Pay & Allowances				
TDY/Transportation				
Program 2 Base Ops				
Training Aids/Devices				
Training Materials & Special Supplies Consumed	___	___	___	___
Fixed				
Program 2 Mission				
Program 2 Base Ops	___	___	___	___
TOTAL:				
TOTAL VARIABLE & FIXED:				

TIME/PERSONNEL

Training Unit Time (Unit hours, e.g., 12 Platoon hours)

Man weeks** of direct effort required to support the Tng: __________

Calendar time period associated with T_A being addressed: (e.g., 1 yr, 1 qt

Identification of Unit from which data was collected. ______________

* Indicate T_{A1} or T_{A2}

** Also maybe expressed as manhours or man months, which ever is most meaningful for the particular situation.

PORTION OF UNIT TRAINING PROGRAMS FOR:

IN#/TASK	TRAINING EVENT	ATTENDED BY	TIME	INSTRUCTOR	TRAINING CATEGORY	YEARLY FREQUENCY
		11E20 TANK GUNNER				
7029	Boresighting	All gunners	4 hrs	PSG	T_{S1}	4
7020	Prepare Range Cards	Gunners		TC	E	Conducted during Co Task 6-12
7022	Prepare to Fire Check	Gunners		TC	E	do
7033	Fire From Range Card	Gunners		Plt Ldr	E	do
	Human Relations	All	2 hrs		T_{S1}	1
	Detail Company	All	8 hrs	N/S	T_N	12
		TANK CREWS				
9-10	Tactical Movement	All tank crews	2 hrs	Plt Ldr	T_{A1}	7
		TANK PLATOONS				
8-29	Plt Battle Run (Live Fire)	All tank Platoons	4 hrs	Plt Ldr	T_{A1}	3
6-12	Prepare Strong Point	Entire Company	4 hrs	Co Cdr	T_{A1}	2

Company A
1st Bn, 53d Armor
TA_1, ID#/TASK 6-12, Tank Platoon Battle Run

Trainee Personnel

MOS	GRADE	AUTH	ASSIGNED	MAN HOURS
11E10	E-3	5	8	32
11E10	E-4	5	2	8
11E20	E-4	0	2	8
11E20	E-5	5	3	12
11E30	E-5	0	1	4
11E30	E-6	3	2	8
11E40	E-6	0	1	4
11E40	E-7	1	0	0

Trainer Personnel

MOS	GRADE	AUTH	ASSIGNED	MAN HOURS
12A	O-1	1	1	8*

* Includes 4 hrs preparation.

Participating Weapons

WPN	CAL AMMO	NO	AVG RD/WPN	AVG MC/WPN
Tank M60A1	105mm	5	7	30
MG, Veb Mtd	.50cal	5	100	0
MG, Veb Mtd	7.62mm	5	400	0

Other Equipment - None.

TDY/Transportation - None. Note: If the platoon expended TDY funds (EOE 2200) or transportation funds (EOE 2100) to travel to a live fire range, these costs would be listed.

Training Aids/Devices Used - None. (If any such materials were used they should be listed to include usage rates. Costs will be provided by ARTS resource POC on a case by case basis as requirements are identified.

Training Materials & Special Supplies Consumed - None. (If any are consumed, quantities should be identified. If costs cannot be determined by SWT, guidance will be provided on a case by case basis).

Training Unit Time - 4 platoon hours.

(Example Format for Resource Data Collection Work Sheet)

Calendar Time Period Associated With TA Being Addressed - N/A (This entry is not applicable for separate training events; however, if events are aggregated over time, that time period should be shown, e.g., 1 yr, 1 qtr, etc.).

Man Hours of Direct Effort Required to Support this Training - 0.2 hrs (This entry includes a prorated share of the time of those responsible within the battalion for training management.

Unit Identification - 1st Platoon, A Co, 1/53 Armor.

NOTE 1: If additional resources were required to support this live fire exercise (e.g., range guards, ammo handlers, controllers, safety personnel, etc. the associated man hours and equipment usage need to be recorded using the same format as for the trainees.

NOTE 2: Calculation of dollar values associated with this training are shown at Incl 1 to this TAB.

Calculations of Dollar Values Associated
With Live Fire Exercises of 1st Platoon, A Co., 1/53 Armor

1. Program 2 - Mission (Equipment Usage) -

Vehicles	Quantity	Avg Mi	Tot Mi	$ Mi*	Total $
M60 TK	5	30	150		

Weapons	Quantity	Cal Ammo	Avg Rd/Wpn	Tot Rd	$/Rd*	Total $
M60 TK	5	105mm	7	35		
MG, HB Fixed	5	.50Cal	100	500		
MG, LT Fixed	5	7.62mm	400	2,000		

Other Equipment - None.
NOTE: See TAB G for a listing of "Other Equipment" and TAB K for appropriate cost factors. $ OMA

2. Ammunition

Cal of Ammo	Total # of Rd	$/Rd*	Total $
105mm	35		
.50Cal	500		
7.62mm	2,000		

$ PA

3. Pay & Allowances

Trainees & Trainers

Grade	No Assigned	Man Hours	$/MH*	Total $
E-3	8	32	4.4329	
E-4	4	16	4.8474	
E-5	4	16	5.7754	
E-6	3	12	6.8523	
O-1	1	8	6.6185	
	15	84		

$ MPA

Battalion Training Management Personnel

Man Hours	$/MH**	Total $
0.02		$ MPA

Other Personnel - None [If other personnel were required to support this training (See NOTE 1 of TAB F) their pay and allowances would be calculated as shown above for trainees and trainers].

$ MPA

Total Pay and Allowances - $ MPA

4. TDY Transportation

NOTE: Cost must be developed locally based upon specific requirements for the training event. This example did not have any requirements.

$ OMA

5. Program 2 Base Ops (Variable)

Total Man Hours	X	$/MH	Total $
84.02			$ OMA

NOTE: Total man hours is the sum of all the man hours associated with the pay and allowances calculations in para 3 above. The $/MH is a MACOM wide cost factor. A listing of these factors is at TAB M.

6. Training Aids/Devices

NOTE: None for this example; however, ARTS Resource POC will provide costs to SWT on a case by case basis as requirements are identified by SWT, costs of locally developed aids/devices must be determined locally. $ OMA $ PA

7. Training Materials & Special Supplies Consumed

NOTE: The NOTE for para 6 applies. $ OMA $ PA

8. Program 2 Mission (Fixed)

Total Man Hours	X	$/MH	Total $
84.02			$ OMA

9. Program 2 Base Ops (Fixed)

Total Man Hours	X	$/MH	Total $
84			$ OMA

* The values for these cost factors are taken from a listing of cost factors found at TAB G&L.

CONTENTS OF TAB G
LISTINGS OF VEHICLE, WEAPONS, OTHER EQUIPMENT, AND AMMO FOR:

Armor Bn	-	TAB G1
Mech Inf Bn	-	TAB G2
Fld Arty (155 SP) Bn	-	TAB G3

ARM BN

VEHICLES

	NOMENCLATURE	AUTH	NO PART	AVG MI /VEH
1 -	CARR.CP	6		
2 -	CARR.[illegible]S.	19		
3 -	LAUNCH.M60 CHAS.	2		
4 -	REC.VEH.LT.	2		
5 -	REC.VEH.MED.	5		
6 -	TRK.AMB.5/4T	1		
7 -	TRK.CGO.5/4T	6		
8 -	TRK.CGO.2 1/2T	21		
9 -	TRK.CGO.5T	6		
10 -	TRK.[illegible]	5		
11 -	TRK.TANKER	4		
12 -	TRK.UTIL.1/4T	34		
13 -	WRECKER.5T	1		
14 -	BRIDGE.SCISSOR	1		
15 -				
16 -				
17 -				
18 -				
19 -				
20 -				

WEAPONS

	NOMENCLATURE	AUTH	CAL AMMO	NO.	AVG RD /WPN	AVG MI /WPN
31 -	CARR.106MM MORT	4	4.2			
32 -	CARR.TOW	4	TOW			
33 -	LAUNCH.GREN.	18	40MM			
34 -	LAUNCH.ROCK.	5	66MM			
35 -	MG.HB.VEH.MTD.	26	.50			
36 -	MG.HB.GND.MTD.	14	.50			
37 -	MG.HB.FIXED	54	.50			
38 -	MG.LT.FIXED	54	7.62			
39 -	PISTOL	280	.45			
40 -	RIFLE	271	5.56			
41 -	SUB MG	122	.45			
42 -	TANK.M60	54	105M			
43 -	TRACKER.SU-36	4	DRAG			
44 -						
45 -						
46 -						
47 -						
48 -						
49 -						
50 -						

OTHER EQUIPMENT

	NOMENCLATURE	AUTH	NO.	AVG MI/HR.
21	-GEN. 5KW.60HZ	8		
22	-[illegible]	7		
23	-GEN [illegible]KW.400HZ	4		
24	-RADAR.AN/PPS 5	4		
25	-[illegible]IT	1		
26	-			
27	-			
28	-			
29	-			
30	-			

OTHER COSTS

	NOMENCLATURE	COSTS
1 -		
2 -		
3 -		
4 -		
5 -		
6 -		
7 -		
8 -		
9 -		
10 -		

REMARKS

1 -	
2 -	
3 -	
4 -	
5 -	
6 -	
7 -	
8 -	
9 -	
10 -	

ARMOR BATTALION
AUTHORIZED AMMUNITION & REQUIREMENTS

	DESCRIPTION	ORT/ARTEP	QUAL/FAM	DODIC	RQMT		DESCRIPTION	ORT/ARTEP	QUAL/FAM	DODIC	RQMT
1	12 GA #7/9 SHOT	0	0	A014	------	2	12 GA #7/9 SHOT	0	0	A017	------
3	5.56 TRACER	1072	0	A068	------	4	5.56 MM BALL	93682	23500	A071	------
5	5.56 MM BLANK	800	363780	A080	------	6	.22 SHT BLANK	0	1200	A085	------
7	.22 BALL LR		132192	A006	------	8	7.62 MM BLANK	0	999700	A111	------
9	7.62 MM TR	270082	63700	A131	------	10	7.62 MM TR CTN	0	150	A140	------
11	.45 BALL	22135	0	A475	------	12	.50 4/1 TR M85	54270	40500	A520	------
13	.50 4/1 M2	11060	8100	A557	------	14	.50 BLANK	0	30000	A5[illegible]	------
15	40 MM HE	312	108	B560	------	16	40 MM PRAC	456	0	B577	------
17	105 MM HEAT	640	0	C508	------	18	105 MM HEP-TPT	540	1080	C510	------
19	105 MM HEAT-TPT	1512	1080	C511	------	20	105 MM WP	0	108	C512	------
21	105 MM HEP-T	432	491	C518	------	22	105 APDS-TP-T	5022	810	C520	------
23	4.2 HE	0	403	C704	------	24	4.2 HE	0	0	C705	------
25	4.2 ILL	1464	540	C706	------	26	4.2 WP	0	90	C708	------
27	[illegible]	235	0	G839	------	28	GREN HD FRAG	555	0	G881	------
29	FZ GREN HD PRAC	555	0	G887	------	30	FZ HD GR PRAC	0	0	G900	------
31	FZ HD GR PRAC	0	0	G924	------	32	GREN SMK HC	0	270	G930	------
33	GREN SMK GRN	0	270	G940	------	34	GREN SMK YEL	0	270	G945	------
35	GREN SMK RED	0	270	G950	------	36	GREN SMK VIOL	0	270	G955	------
37	GREN HD CS	0	300	G924	------	38	GREN HD CS	0	0	G963	------
39	RKT 66 MM LAW	100	54	H557	------	40	RKT 35 MM SUB CAL	2775	108	H708	------
41	FZ MINE AT PRAC	0	96	K051	------	42	MINE AP PRAC M68	0	192	K129	------
43	MINE AT PRAC M20	0	96	K231	------	44	CAPSULE CS	0	168	K765	------
45	SMK POT HC	0	90	K866	------	46	SIGNAL GSP	0	260	L310	------
47	SIGNAL RSC	0	130	L306	------	48	SIGNAL WSC	0	260	L307	------
49	SIGNAL RSP	0	130	L311	------	50	SIGNAL WSP	0	130	L312	------
51	SIGNAL GSC	0	130	L314	------	52	SIG SMK GRN (MINI)	0	750	L341	------
53	SIG SMK RED (MINI)	0	750	L342	------	54	SIG SMK YEL (MINI)	0	750	L343	------
55	FLARE TRIP	0	120	L495	------	56	SIM GRND BRST	0	2000	L594	------
57	SIM [illegible] FLASH	0	100	L598	------	58	SIM BOOB ILL	0	100	L597	------
59	SIM [illegible] WHIS	0	100	L600	------	60	SIM HD GREN	0	1100	L601	------
61	SIM ATOM EXPL	0	12	L605	------	62	DEMO TNT 1/4#	42	360	M030	------
63	CRATER [illegible]	0	32	M039	------	64	CAP BLST ELEC	0	390	M130	------
65	CAP BLST NON ELEC	42	20	M131	------	66	COUPL BS F DEV	0	90	M[illegible]7	------
67	CHARGE 40#	0	20	M421	------	68	CORD DET	0	2000	M456	------
69	FZ BLST TIME	100	190	M670	------	70	IGN TIME FZ	42	60	766	------
71	[illegible] CAP M2	0	830	M910	------	72	FUZE PD	0	222	N335	------
73	FUZE PROX	0	93	N412	------	74	REDEYE	0	1	P923	------
75	GM TOW HEAT	0	2	1521	------	76	GM TOW PRAC	0	2	1527	------
77	BLAST SIM TOW	0	420	2566	------						

MECH INF BN

VEHICLES

	NOMENCLATURE	AUTH	NO PART	AVG MI /VEH
1 -	CARRIER,M577	7		
2 -	CARRIER,M113	59		
3 -	RECOV.VEH,M578	6		
4 -	TRK,AMB,5/4 TON	1		
5 -	TRK,CGO,5/4 TON	7		
6 -	TRK,CGO,2 1/2T	14		
7 -	TRK,CGO,2 1/2T W	2		
8 -	TRK,CGO,5 TON	6		
9 -	TRK,5TON,W/W	9		
10 -	TRK,UTIL,1/4 T	34		
11 -	WRECKER,5 TON	1		
12 -				
13 -				
14 -				
15 -				
16 -				
17 -				
18 -				
19 -				
20 -				

WEAPONS

	NOMENCLATURE	AUTH	CAL AMMO	NO.	AVG RD /WPN	AVG MI /WPN
31 -	CARR,M125,81MM	9	81			
32 -	CARR,M106,107MM	4	4.2			
33 -	CARR,TOW	22	TOW			
34 -	LAUNCH,GREN	95	40			
35 -	LAUNCH,ROCK	9	66			
36 -	MG,VEH,MTD	97	50			
37 -	MG,GND,MTD	26	50			
38 -	MG,LT,M60	49	7.62			
39 -	PISTOL	116	45			
40 -	RIFLE,M16	731	5.56			
41 -	SUB MG	45	45			
42 -	TRACK,SU36	40	DGN			
43 -						
44 -						
45 -						
46 -						
47 -						
48 -						
49 -						
50 -						

OTHER EQUIPMENT

	NOMENCLATURE	AUTH	NO.	AVG MI/HR.
21	-RADAR,AN/PPS5	4		
22	-RADIO,AN/PRC77	12		
23	-GEN,5KW,60HZ	1		
24	-GEN,5KW,400HZ	4		
25	-GEN,1.5KW,60HZ	13		
26	-GEN,1.5KW,DC	2		
27	-COMP,(ALL)	5		
28	-RTT	1		
29	-			
30	-			

OTHER COSTS

	NOMENCLATURE	COSTS
1 -		
2 -		
3 -		
4 -		
5 -		
6 -		
7 -		
8 -		
9 -		
10 -		

REMARKS

1 -	
2 -	
3 -	
4 -	
5 -	
6 -	
7 -	
8 -	
9 -	
10 -	

Mech Inf Bn Ammo

	DESCRIPTION	ORT/ARTEP	QUAL/FAM	DODIC	RQMT		DESCRIPTION	ORT/ARTEP	QUAL/FAM	DODIC	RQMT
1	12 GA 09 SHOT	0	0	A014	------	2	12 GA 09 SHOT	0	0	A017	------
3	5.56 MM TR	2848	135000	A068	------	4	5.56 MM BALL	203900	221100	A071	------
5	5.56 MM BLANK	800	212230	A080	------	6	.22 BLNK/TNR M32	0	3900	A085	------
7	7.62 BLANK	0	120000	A111	------	8	7.62 4/1 TR	82796	196000	A131	------
9	7.62 BALL	10522	0	A143	------	10	7.62 MM TR	0	19500	A146	------
11	.45 BALL	12530	0	A475	------	12	.50 4/1 TR	46242	50000	A557	------
13	.22 PRAC CHG 1	0	675	A680	------	14	.22 PRAC CHG 2	0	675	A681	------
15	.22 PRAC CHG 3	0	675	A602	------	16	.22 PRAC CHG 4	0	675	A683	------
17	40 MM HE	1526	900	B568	------	18	40 MM PRAC	2214	0	B577	------
19	81 MM ILL	0	900	C226	------	20	81 MM HE	0	3000	C256	------
21	81 MM WP	0	600	C276	------	22	90 MM HEAT	154	150	C282	------
23	4.2 HE W/OFZ	0	1060	C705	------	24	4.2 ILL W/FZ	756	244	C706	------
25	4.2 WP W/PZ	0	200	C708	------	26	DRAGON	235	0	G039	------
27	FZ GREN HD PRAC	050	162	G070	------	28	GREN HD PRAC	050	162	G078	------
29	GREN HD FRAG	050	0	G881	------	30	GREN SMK HC	0	270	G930	------
31	GREN SMK GREEN	0	270	G940	------	32	GREN SMK YEL	0	270	G945	------
33	GREN SMK RED	0	270	G950	------	34	GREN SMK VIOL	0	270	G955	------
35	GREN HD CS	0	300	G924	------	36	GREN HD CS	0	0	G963	------
37	RKT 66 MM INCEND	201	0	H110	------	38	RKT 35 MM PRAC	1241	0		------
39	RKT 66 MM LAW	100	100	H557	------	40	RKT 35 MM LAW	4250	1692	H708	------
41	MINE AP M14	0	324	K121	------	42	MINE AP M18	0	150	K143	------
43	CAPSULE CS	0	100	K765	------	44	RC CS JEEPO	0	103	K768	------
45	SMK POT CS	0	35	K866	------	46	SIGNAL GSP	0	150	L305	------
47	SIGNAL GSP	0	0	L310	------	48	SIGNAL RSC	0	150	L306	------
49	SIGNAL WSC	0	150	L307	------	50	SIGNAL RSP	0	150	L311	------
51	SIGNAL WSC	0	150	L314	------	52	SIGNAL GSC	0	150	L314	------
53	SIG SMK WHT (MIN)	0	750	L340	------	54	SIG SMK GRN (M)	0	750	L341	------
55	SIG SMK RED (M)	0	750	L34	------	56	SIG SMK YEL (M)	0	750	L	------
57	FLARE TRIP	0	250	L495	------	58	SIM GRND BRST	0	575	L594	------
59	SIM BOOBY FLSH	0	150	L590	------	60	SIM BOOBY ILL	0	150	L599	------
61	SIM BOOBY WHIS	0	150	L600	------	62	SIM HD GREN	0	1770	L601	------
63	SIM ATOM EXPLO	0	10	L605	------	64	CHG DEMO 1/4TNT	109	370	M030	------
65	CAP BLST ELEC	0	050	M130	------	66	CAPBLST NON ELEC	109	370	M131	------
67	FZ BLST TIME	756	1512	M670	------	68	IGN TIME FZ	109	370	M765	------
69	FZ PR M557	0	1060	N335	------	70	REDEYE	1	0	1425	------
71	GM TOW HEAT	11	0	1410	------	72	GM TOW PRAC	11	0	1410	------
73	BLST SIM TOW	7590	0	1337	------						

TAB G -

FIELD ARTILLERY BN - 155 mm SP

VEHICLES

	NOMENCLATURE	AUTH	NO PART	AVG MI /VEH
1 -	CARR [illegible] 6T	18		
2 -	CARR CP M577	10		
3 -	VE[illegible]REC.LT	2		
4 -	TRK CGO 3/4T	16		
5 -	TRK AMB 3/4T	1		
6 -	TRK CGO 2 1/2 T	19		
7 -	TRK CGO 5T	1		
8 -	TRK CGO 8T	18		
9 -	TRK TOWS	2		
10 -	TRK UTIL 1/4T	24		
11 -	W[illegible].10T	1		
12 -				
13 -				
14 -				
15 -				
16 -				
17 -				
18 -				
19 -				
20 -				

WEAPONS

	NOMENCLATURE	AUTH	CAL AMMO	NO.	AVG RD /WPN	AVG MI /WPN
31 -	HOW.155.SP	18	155			
32 -	LAUNCH.GREN.	50	40MM			
33 -	LAUNCH.RKT	3	115			
34 -	MG.HB.VEH MTD	38	.50			
35 -	MG.LT	32	7.62			
36 -	PISTOL	23	.45			
37 -	RIFLE	505	5.56			
38 -	SUB MG	4	.45			
39 -						
40 -						
41 -						
42 -						
43 -						
44 -						
45 -						
46 -						
47 -						
48 -						
49 -						
50 -						

OTHER EQUIPMENT

	NOMENCLATURE	AUTH	NO.	AVG MI/HR.
21	[illegible] (ALL)	6		
22	[illegible] 60HZ	6		
23	[illegible] 60HZ	8		
24	[illegible]	7		
25	[illegible] 60HZ	2		
26	[illegible]IO.AN/PRC77	4		
27	KIT	5		
28				
29				
30				

OTHER COSTS

	NOMENCLATURE	COSTS
1 -		
2 -		
3 -		
4 -		
5 -		
6 -		
7 -		
8 -		
9 -		
10 -		

REMARKS

	REMARKS
1 -	
2 -	
3 -	
4 -	
5 -	
6 -	
7 -	
8 -	
9 -	
10 -	

FIELD ARTILLERY - 155 SP
AUTHORIZED AMMUNITION & REQUIREMENTS

	DESCRIPTION	ORT/ARTEP	QUAL/FAM	DODIC	RQMT
[illegible]	[illegible]	0	0	A014	------
[illegible]	[illegible]	0	2072	A059	------
[illegible]	[illegible]	147000	400	A080	------
[illegible]	[illegible] 4/1 TR	0	29448	A131	------
[illegible]	[illegible] 6 SEC	198	198	A365	------
[illegible]	[illegible]	2564	0	A367	------
13	[illegible] CAL 4/1/TR	4563	2128	A557	------
[illegible]	[illegible]	1	1200	B577	------
[illegible]	[illegible]	500	0	[illegible]	------
[illegible]	[illegible] 155 WB	4769	0	[illegible]	------
[illegible]	[illegible]	376	0	D548	------
[illegible]	[illegible]	100	0	D549	------
[illegible]	[illegible]	100	0	D551	------
[illegible]	[illegible]	0	539	G881	------
[illegible]	[illegible]	446	0	G930	------
[illegible]	[illegible]	390	0	G945	------
[illegible]	[illegible]	50	0	G924	------
[illegible]	[illegible]	120	100	H557	------
[illegible]	[illegible] HE	100	0	L306	------
[illegible]	SIG [illegible] STAR CLUST	360	0	L314	------
[illegible]	[illegible] EXPL	10	0	L605	------
[illegible]	[illegible]	[illegible]	0	M130	------
[illegible]	[illegible]	[illegible]	0	M420	------
[illegible]	[illegible]	2100	0	M570	------
[illegible]	[illegible]	459	0	N243	------
[illegible]	[illegible]	[illegible]	0	N278	------
[illegible]	[illegible] M564	[illegible]	0	N311	------
[illegible]	[illegible]	0	1	1825	------

	DESCRIPTION	ORT/ARTEP	QUAL/FAM	DODIC	RQMT
2	12 GA #2 SHOT	0	0	A017	------
4	5.56 BALL	0	175512	A071	------
6	7.62 MM BLANK	95000	0	A111	------
8	7.62 MM BALL	0	12096	A143	------
10	14.5 MM 6 SEC	198	0	[illegible]	------
12	45 CAL BALL	0	1564	[illegible]	------
14	40 MM HE	0	600	[illegible]	------
16	155 MM ILL	480	0	[illegible]	------
18	155 MM [illegible]	10	0	[illegible]	------
20	155 MM HE	3790	0	[illegible]	------
22	155 MM RED SMK	100	0	[illegible]	------
24	155 MM WP	223	0	[illegible]	------
26	FUZE HD GR PRAC	0	539	[illegible]	------
28	GR HD INCEND	45	0	G900	------
30	GREN SMK GREEN	300	0	[illegible]	------
32	GREN SMK RED	100	0	[illegible]	------
34	GREN HD CS	0	0	[illegible]	------
36	35 MM SUB CAL LAW	2695	2695	[illegible]	------
38	SIG RED STAR CLUST	360	0	L306	------
40	SIM PROJ GRND BRST	400	0	L594	------
42	CHG DEMO C4 1 1/4#	50	0	M023	------
44	CAP BLAST NON ELEC	540	0	M131	------
46	CORD DET	2755	0	[illegible]	------
48	I N TM FUZE	540	0	[illegible]	------
50	FUZE MTSQ M501	404	0	[illegible]	------
52	FUZE PD M557	2748	0	[illegible]	------
54	PRIM PERC M82	5615	0	[illegible]	------

COMPOSITE STANDARD RATES FOR COSTING MILITARY PERSONNEL SERVICES

PAY GRADE	ANNUAL RATE	HOURLY RATE*
E-1	$ 6,561	$ 3.5503
E-2	7,557	4.0892
E-3	8,192	4.4329
E-4	8,958	4.8474
E-5	10,673	5.7754
E-6	12,663	6.8523
E-7	15,192	8.2208
E-8	17,777	9.6196
E-9	21,415	11.5882
W-1	14,528	7.8615
W-2	16,638	9.0032
W-3	20,039	10.8436
W-4	25,075	13.5687
O-1	12,231	6.6185
O-2	16,677	9.0243
O-3	21,395	11.5774
O-4	25,988	14.0628
O-5	31,521	17.0568
O-6	38,674	20.9275

*Hourly rate based on 1848 hour military man year.

TO BE PUBLISHED

TAB's I, J, K

CONTENTS OF TAB L

AMMUNITION COST PER RD BY TYPE BN FOR:

Armor Bn	-	TAB L1
Mech Inf Bn	-	TAB L2
Fld Arty (155 SP) Bn	-	TAB L3

ARMOR BN
AMMO COST PER ROUND

1	12 GA #7/9 SHOT	A014	9E-2	2	12 GA #7/9 SHOT	A017	.1
3	5.56 TRACER	A068	.12	4	5.56 MM BALL	A071	8E-2
5	5.56 MM BLANK	A080	7E-2	6	.22 SHT BLANK	A065	3E-2
7	.22 BALL LR	A086	1E-2	8	7.62 MM BLANK	A111	.14
9	7.62 4/1 TR	A131	[illegible]	10	7.62 MM TR CTN	A140	.15
11	.45 [illegible]	A475	.1	12	.50 4/1 TR M85	A520	.85
13	.50 4/1 M2	A557	.69	14	.50 BLANK	A557	.18
15	40 MM [illegible]	B563	[illegible]	16	40 MM PRAC	B577	[illegible]
17	105 MM HEAT	C508	141.74	18	105 MM HEP-TPT	C510	[illegible]
19	105 MM HEAT-TPT	C511	99.31	20	105 MM WP	C512	111.[illegible]
21	105 MM HEP-T	C51[illegible]	110.00	22	105 APDS-TP-T	C520	145.18
23	4.2 HE	C704	81.12	24	4.2 HE	C705	57.07
25	4.2 ILL	C706	90.13	26	4.2 WP	C703	85.15
27	FRAG [illegible]	G039	.34	28	GREN HD FRAG	G881	1.[illegible]
29	FZ GREN HD PRAC	G087	.62	30	FZ HD GR PRAC	G900	9.25
31	FZ HD GR PRAC	G924	6.93	32	GREN SMK HC	G930	[illegible]
33	[illegible]	G940	[illegible]	34	GREN SMK YEL	G945	[illegible]
35	[illegible]	G950	15.[illegible]5	36	GREN SMK VIOL	G955	9.25
37	GREN HD CS	G924	6.93	38	GREN HD CS	G963	7.5
39	[illegible] LAW	H557	70.05	40	RKT 35 MM SUB CAL	H709	7.05
41	[illegible] MINE AT PRAC	K051	1.36	42	MINE AP PRAC M69	K129	20.43
43	MINE AT PRAC M20	K231	19.01	44	CAPSULE CS	K755	.21
45	SMK POT HC	K866	69.44	46	SIGNAL GSP	L310	7.7[illegible]
47	SIGNAL RSC	L306	15.08	48	SIGNAL WSC	L307	[illegible]
49	SIGNAL WSP	L311	18.74	50	SIGNAL WSP	L312	[illegible]
51	SIGNAL GSC	L314	15.85	52	SIG SMK GRN (MINI)	L741	1.28
53	SIG SMK RED (MINI)	L342	1.45	54	SIG SMK YEL (MINI)	L393	1.55
55	FLARE TRIP	L495	5.56	56	SIM GRND BRST	L594	2.32
57	SIM BOOB FLASH	L598	2.6	58	SIM BOOB ILL	L597	2.3[illegible]
59	SIM [illegible] WHIS	L600	1.66	60	SIM HD GREN	L641	1.17
61	SIM [illegible] EXPL	L605	401.14	62	DEMO TNT 1/4#	M030	[illegible]
63	[illegible]	M039	36.61	64	CAP BLST ELEC	M130	[illegible]
65	CAP BLST NON ELEC	M131	.32	66	COUPL BS F DEV	M327	[illegible]
67	[illegible]	M421	57.48	68	CORD DET	M456	.1
69	[illegible] TIME	M626	6E-2	70	IGN TIME FZ	[illegible]	1.04
	[illegible] PERC CAP M2	M010	[illegible]	72	FUZE PD	N335	8.21
73	FUZE [illegible]	N412	4[illegible]	74	REDEYE	9723	9407
75	GM TOW HEAT	1521	3169	76	GM TOW PRAC	1527	3005
77	[illegible] SIM TOW	2566	.72				

MECH INF BN
AMMO COST PER ROUND

1	12 GA #[illegible] SHOT	A014	9E-2	2	12 GA #9 SHOT	A017	.1
3	5.56 MM TR	A068	.12	4	5.56 MM BALL	A071	8E-2
[illegible]	5.56 MM BLANK	A080	7E-2	6	.22 BLNK/TNR M32	A085	3E-2
7	7.62 BLANK	A111	.14	8	7.62 4/1 TR	A131	.21
[illegible]	[illegible] BALL	A143	.17	10	7.62 MM TR	A146	.17
[illegible]	[illegible] BALL	A475	.1	12	.50 4/1 TR	A557	.69
[illegible]	.22 PRAC CHG 1	[illegible]680	5.7	14	.22 PRAC CHG 2	A681	5.7
[illegible]	.22 PRAC CHG 3	A682	5.7	16	.22 PRAC CHG 4	A683	5.7
[illegible]	40 MM HE	B563	3.6	18	40 MM PRAC	B577	3.5
[illegible]	81 MM ILL	C226	41.63	20	81 MM HE	C256	35.94
[illegible]	81 MM WP	C276	37.08	22	90 MM HEAT	C202	91.44
[illegible]	[illegible] HE W/[illegible]	C705	67.07	24	4.2 ILL W/FZ	C706	90.13
[illegible]	[illegible] WP W/PZ	C708	85.15	26	DRAGON	GB39	.34
[illegible]	[illegible] HD PRAC	G878	.62	28	GREN HD PRAC	G879	1.96
[illegible]	[illegible]	G891	1.96	30	GREN SMK HC	G930	7.76
[illegible]	[illegible]	[illegible]	9.04	32	GREN SMK YEL	G945	10.16
[illegible]	[illegible]	G950	15.55	34	GREN SMK VIOL	G955	9.25
[illegible]	[illegible] CS	G924	6.93	36	GREN HD CS	G963	7.5
[illegible]	[illegible] INCEND	H110	200.93	38	RKT 35 MM PRAC		0
[illegible]	[illegible]	H557	70.06	40	RKT 35 MM LAW	H708	7.03
[illegible]	[illegible] AP M14	K121	2.8	42	MINE AP M18	K143	26.23
[illegible]	[illegible]	K765	.21	44	RC CS JEEPO	K768	4.17
[illegible]	[illegible]	K366	69.44	46	SIGNAL GSP	L305	17.49
[illegible]	[illegible]	L310	7.94	48	SIGNAL RSC	L306	15.08
[illegible]	[illegible]	L307	13.52	50	SIGNAL RSP	L311	15.74
[illegible]	[illegible]	L314	15.85	52	SIGNAL GSC	L314	15.85
[illegible]	[illegible]	L340	1.19	54	SIG SMK GRN (M)	L341	1.26
[illegible]	[illegible] (M)	L[illegible]	1.45	56	SIG SMK YEL (M)	L	1.55
[illegible]	[illegible]	L495	5.56	58	SIM GRND BRST	L594	2.32
[illegible]	[illegible]	L593	2.67	60	SIM BOOBY ILL	L599	2.36
[illegible]	[illegible]	L600	1.86	62	SIM HD GREN	L601	1.17
[illegible]	[illegible]	L605	[illegible]01.14	64	CHG DEMO 1/4TNT	M030	.63
[illegible]	[illegible]	M130	.92	66	CAFBLCT NON ELEC	M131	[illegible]
[illegible]	[illegible]	M670	6E-2	68	IGN TIME FZ	M766	[illegible]
[illegible]	[illegible]	N335	0.21	70	REDEYE	1425	9407
[illegible]	[illegible]	1410	3169	72	GM TOW PRAC	1410	3005
[illegible]	[illegible]	1337	.72				

ARTILLERY BN 155 mm SP
AMMO COST PER ROUND

1	12 GA #? SHOT	A014	9E-2	2	12 GA #9 SHOT	A017	[illegible]
3	5.56 MM TR	A068	.12	4	5.56 BALL	A071	6E-2
5	5.56 BLANK	A080	7E-2	6	7.62 MM BLANK	A111	.14
7	7.62 MM 4/1 TR	A131	.21	8	7.62 MM BALL	A143	.17
[illegible]	14.5 MM 3 SEC	A365	3.68	10	14.5 MM 6 SEC	A366	3.68
11	14.5 MM [illegible]	A367	3.29	12	.45 CAL BALL	A475	.1
13	.50 CAL 4/1/TR	A557	.69	14	40 MM HE	B569	[illegible]
15	40 MM PRAC	B577	3.5	16	155 MM ILL	D505	167.89
17	CHG PROP 155	D540	24.6	18	155 MM HE	D562	310.57
19	CHG PROP 155 WB	D541	29.2	20	155 MM HE	D544	70.08
21	155 MM HC	D548	172.48	22	155 MM RED SMK	D551	162.79
23	155 MM RED SMK	D549	182.28	24	155 MM WP	D550	88.[illegible]
25	155 MM YEL SMK	D551	162.79	26	FUZE HD GR PRAC	G878	.62
27	GREN HD FRAG	G881	1.96	28	GR HD INCEND	G900	9.[illegible]
29	GREN SMK HC	G930	7.76	30	GREN SMK GREEN	G940	9.04
31	GREN SMK YEL	G945	10.16	32	GREN SMK RED	G950	15.[illegible]
33	GREN HD CS	G924	6.93	34	GREN HD CS	G963	7.5
35	66 MM LAW M72	H557	70.06	36	35 MM SUB CAL LAW	H708	7.05
37	SMK POT HC	L306	69.44	38	SIG RED STAR CLUST	L306	15.08
39	SIG GRN STAR CLUST	L314	15.85	40	SIM PROJ GRND BRST	L594	2.32
41	SIM ATOM EXPL	L605	401.14	42	CHG DEMO C4 1 1/4#	M023	2.[illegible]
43	CAP BL ELEC	M130	.92	44	CAP BLAST NON ELEC	M131	.32
45	CHG DEMO SHPD 15#	M420	48.59	46	CORD DET	M456	.1
47	TIME FUZE	M670	6E-2	48	IGN TM FUZE	M766	7.34
[illegible]	FUZE MT M5[illegible]	N240	24.12	50	FUZE MTSQ M501	N276	12.7
[illegible]	FUZE MTSQ M564	N278	29.18	52	FUZE PD M557	N3[illegible]	[illegible]
53	FUZE PROX M514	N411	44.39	54	PRIM PERC M82	N523	.7[illegible]
55	[illegible]	1425	9407				

MACOM COST FACTORS

	USAREUR	FORSCOM
Program 2 Mission (Fired)		
Program 2 Base Ops (Variable)		
Program 2 Base Ops (Fixed)		

TO BE PUBLISHED

TO BE PUBLISHED

TAB N

INDIVIDUAL TEST PLANS

CORE TEST OBJECTIVES

A. CONTINUE VALIDATION OF THREAT ORIENTED CRITICAL SM/ARTEP TASKS, CONDITIONS, STANDARDS.

. CHALLENGE: Continuation of critical task identification through documented front-end analysis for weapons/equipments and units/jobs is an essential part of the Army Training System.

. CONCEPT: Training analysis will continue to form the basis for training development decisions. Modification to training analysis methodology will be limited to that necessary to insure continuity with situational variables and other core objectives.

B. DETERMINE TIME/COSTS TO ACHIEVE OPTIMAL PROFICIENCY FOR CRITICAL INDIVIDUAL/COLLECTIVE TASKS.

. CHALLENGE: To justify training resource requirements, it is necessary to quantify costs attributable to attaining optimal proficiency. Once these costs are established, resources to support training requirements/missions allocation and reallocation between the training base and units in the field can be made rapidly and accurately.

. CONCEPT: The ARTS developed training resource methodology will become a part of training development methodology.

C. CONTINUE TO DEVELOP DIAGNOSTIC TESTS TO MEASURE INDIVIDUAL/COLLECTIVE LEARNING DECAY LEVELS.

. CHALLENGE: Individual/collective learning decay rates must be determined for each weapon and equipment system/unit/job in order to quantify existing proficiency levels and to fund retraining requirements to obtain optimal proficiency.

Incl 4

. CONCEPT: Training analysis during testing is to be designed to measure skill acquisition and learning decay over time by use of diagnostics and retraining time. Development of diagnostic testing is critical to success as retraining requirements must be based on the Delta between proficiency attained at completion of training and subsequent residual proficiency. In other words, we retrain only that which has been lost, not that which has been retained.

D. DETERMINE DECAY RATES AND FREQUENCY OF RETRAINING REQUIRED TO SUSTAIN OPTIMAL PROFICIENCY FOR INDIVIDUAL/COLLECTIVE TASKS (TIME/COSTS).

. **CHALLENGE AND CONCEPT:** See Objective C above.

CORE TEST OBJECTIVES
EEA

A. Continue validation of threat oriented <u>critical</u> SM/ARTEP tasks, conditions, standards.

   1. Are SM tasks/ARTEP events based on the documented results of appropriate front-end analysis techniques?

   2. Are ARTEP events supported with prerequisite SM tasks?

   3. Was performance of SM/ARTEP tasks actually necessary for the accomplishment of a specific mission? (i.e., was it truly a critical task?).

   4. Is the specific level of proficiency greater than, equal to, or less than that required to meet the threat?

B. Determine time/costs to achieve optimal proficiency for critical individual/collective tasks.

   1. What resources are required in the institution?

      a. Dollars
      b. People
      c. Time
      d. Dollars and people
      e. Dollars and time
      f. People and time
      g. Dollars, people and time

   2. What are resources required in the unit?

      a. Dollars
      b. People
      c. Time
      d. Dollars and people
      e. Dollars and time
      f. People and time
      g. Dollars, people and time

   3. Does the collected data reflect deviation from real-world normalcy, i.e., validity of trainee/instructor, NCO/officer fill, unusual environmental constraints or advantages?

C. Continue to develop diagnostic tests to measure individual/collective learning decay levels.

   1. Do current diagnostic tests account for learning/decay which occurs subsequent to course/period of instruction?

2. Does the diagnostic test program provide for testing at two or more data points? (i.e., 30, 60 & 180 days after training).

3. Do diagnostic tests provide data to determine specific skill/proficiency loss and retraining to proficiency required? (i.e., make the corrective action obvious).

4. What is the training resource requirement to reacquire mastery after various intervals subsequent to the original training program? (Note: All training activity, or lack thereof, must be considered.)

D. Determine decay rates and frequency of retraining required to sustain optimal proficiency for individual/collective critical tasks (time/costs).

1. What is the time to initially learn a skill to mastery?

2. After specified intervals without practice what is the time required to relearn a skill to mastery?

3. Within task performance, which elements are forgotten first?

4. What is the frequency of retraining or practice necessary to ensure retention of acceptable levels of proficiency?

1. Reduce Length of Selected Courses for High Density/Low Technology MOS's vs. Low Density/High Technology MOS's

2. Resources/Effect of Training Common vs. Technical Skills Only in Institutions

Not used in TEA 78

3. Optimal Allocation of Training Tasks Between Institution/Unit

• CHALLENGE: Resources required to train to proficiency in collective/individual tasks vary as a function of the type task. Acceptable levels of decay in proficiency vary with the missions assigned to the unit. It is necessary to identify required resources, rates of decay for critical tasks, and retraining frequencies. Such determination will form the basis for allocation of training resources.

• CONCEPT: Data should be extracted, as available, from tests as to time and training methods to train to individual proficiency. Post training diagnostic tests administered to determine proficiency decay over time of critical skills can be one indicator of training best conducted in the unit or institution. Skills with lengthy retention, best taught with sophisticated training aids are best taught in the training base. Conversely, skills of short retention with hands-on practice required to maintain proficiency are best taught in the unit. This determination will be a function of the degree of simulator/instructor intensive support required and the rate of past training decay. (See TRADOC Pamphlet 350-30)

4. Validate Selected Critical Tasks For Service School Development of How to Train to Combat Proficiency at Least Cost in a Unit

Not used in TEA 78

5. Impact of Transfer of Selected AIT to FORSCOM

• CHALLENGE: To determine a cost efficient policy for training entry level soldiers to proficiency in common and MOS related skills. The feasibility of providing only basic training for selected skills in the training base needs to be tested.

• CONCEPT: The test would be conducted by providing to units, replacement personnel in selected MOS, who have completed only common skills basic training. The unit would be required to train all such personnel to proficiency in MOS related skills without increase in current ALO. TRADOC schools will provide the training packages and MTT's to ensure supervisor competence as required. Training within the unit should be conducted on a schedule as desired by the commander, excepting that proficiency required be as established by the proponent school. Evaluation of comparative costs and the effects of this additional training load on unit readiness will be determined by comparison to OSUT costs/proficiency with a baseline unit and by test agency evaluation of resultant individual and unit proficiency.

6. Impact of Transfer of BT to FORSCOM

7. Impact of Transferring all Entry Level Training to FORSCOM

8. Impact of Transfer of all Except Critical Task Training to FORSCOM

9. Impact of Transfer of all Except High-Technology Task Training to FORSCOM

10. Effect of Expanded BT to Develop Cross Training in Support MOS

Not used in TEA 78

11. Effect of Expanded OSUT for Selected High-
pri Weapons

• CHALLENGE: To determine a cost efficient policy for training selected entry level soldiers in common and high priority weapon system skills. The effect on unit training and costs of providing training to maximum proficiency on critical tasks in the training base needs to be tested.

• CONCEPT: The test would be executed over an extended period by conducting entry level training to varying levels of proficiency by expanding selected OSUT. Testing will involve control and test groups. Post graduation testing to determine learning decay/retraining rates between test and control group will provide data needed to design training programs. These programs provide a basis for timely resource distribution to ensure enhanced individual skill proficiency and retention for high priority weapons systems.

12. Determine Exportable/Job Training Packages Required to Support Training in Units

· CHALLENGE: To rapidly train, sustain or retrain soldiers/units in skills when the situation does not permit conventional training or when the skill can be more adequately taught by use of training packages.

· CONCEPT: The concept is to prioritize skills which are critical and then teach these skills in an intensively structured series of indiv/collective training periods. Maximum use of training will be made. Testing will center on comparative analysis of costs and proficiency attained over time against a baseline of similar proficiency levels attained through conventional training. Consider the following in sequence:

a. Job performance aids

b. Self-teaching, exportable packages

c. Formal/supervised OJT programs

d. Installation (shadow) or unit school

13. Determine Training Packages to Assure Supervisor Competence

14. Determine MOS Transition Training on Proficiency on New Equipment/Job

15. Determine Resources Required to Attain Unit Collective Proficiency (T_A)

Not used in TEA 78

16. Effects of Personnel Stability/Turbulence on Individual/Collective Proficiency

· CHALLENGE: Lack of personnel stability results in lengthened training/retraining time to achieve collective proficiency in critical task skills as well as accelerated decay of collective proficiency.

· CONCEPT: Testing the effects of turbulence and stability envisions introducing controlled turbulence or quantifying existing turbulence in the training environment (within crews and within companies) and then measuring the proficiency decrease in contrast to the proficiency of more stabilized crews/units. This should permit determination of the increased resources and time necessary to attain and maintain individual/collective proficiency when there is high personnel instability by determining the level of over-training required to maintain a desired level of proficiency. Consider also:

a. Effects on unit training programs (continuity)

b. Effects on development of leadership

c. Attitudes on training such that retraining frequency is changed.

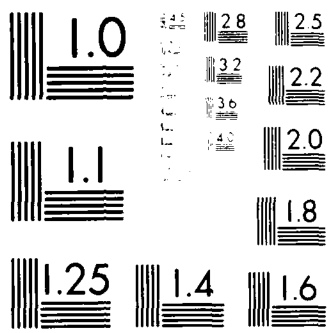
17. Determine effects of Reduced Officer/NCO Fill on Collective/Individual Training

• CHALLENGE: A low percentage of officer/NCO fill interacts with other unit training distractors (turbulence, troop diversions, auth absences, etc.) to degrade training effectiveness and proficiency.

• CONCEPT: Testing the training effects of officer/NCO fill variables requires evaluation of fill variation in conjunction with testing. Data will be extracted to enable determination of the resources necessary at different levels of officer/NCO fill to attain individual/collective critical task proficiency and to establish the type and frequency of retraining necessary to maintain that proficiency.

AD-A186 322 ARMY TRAINING STUDY: TRAINING EFFECTIVENESS ANALYSIS (TEA) SUMMARY(U) ARMY TRAINING AND DOCTRINE COMMAND FORT MONROE VA F J BROWN ET AL 08 AUG 78 3/4

UNCLASSIFIED SBI-AD-F000 106 F/G 15/1 NL



MICROCOPY RESOLUTION TEST CHART

18. Effects of Introducing Less Capable Personnel into the Training Base and Units

• CHALLENGE: The AWC SSI study on Army 85 predicts the typical incoming soldier of 1985 will be less capable of mastering complex training than his comparable peer today.

• CONCEPT: Testing the effects of less capable trainees envisions special attention under controlled conditions, to determine the problems which result. Testers should identify less capable personnel participating in test activities and seek to determine the additional resources needed to bring these soldiers to average proficiency. The effects that application of these additional resources have on other trainees and unit training programs should also be quantified. A range of solutions applicable to a specific set of tasks, conditions and standards should be obtained. Data will be extracted to assist in determination of personnel selection criteria.

19. Evaluation of Rapid Refresher Training Programs for Reserve Component Units

• CHALLENGE: Reserve Component units must be rapidly trained up with refresher training to peak critical task skills prior to deployment. (Pre and post M-day)

• CONCEPT: Train-up packages for critical systems and units must be designed, fielded and validated for Reserve Component units. Packages must be designed such that training can be accomplished by RC trainers. They must produce units trained to combat proficiency in the shortest time, both pre and post mobilization. After the packages have been validated at company level, battalion level packages will be developed. In addition, further packages must be devised to rapidly train up troops who, after deployment, are issued new and different equipment. Training packages (modular training) will be administered to RC units. Post training proficiency will be measured against baseline units trained under existing RC programs. Costs to proficiency and levels of proficiency will be compared to validate training modules and to provide necessary feedback to modify modules as necessary.

20. Develop Training Concepts to Individual/Collective Proficiency with Reduced Resources

• CHALLENGE: Training systems must be devised to enable the institution and units to train to proficiency within decremented resources.

• CONCEPT: Training programs for testing will be analyzed to identify use of advanced or innovative training techniques which result in a degree of proficiency at reduced resources. The effectiveness of these innovative programs should be validated during testing and reports prepared which document fully the resources, training events and level of proficiency attained. Where possible, decay rates for proficiency thus obtained should be determined and compared to conventional training decay.

21. Develop Replacement (D+30 to D+180) Unit Upgrade Training Programs

22. Determine Training Required to Exploit the Enhanced Capability Designed into Modernized Equipment

23. Determine Optimal Use of Equipment Pools to Support AC/RC Unit Training

24. Develop Training Programs to Assimilate New Equipment in Units

Not used in TEA 78

25. Validate Effectiveness and Efficiency of Training Devices

- CHALLENGE: Training devices are developed in concert with the major system they are designed to support. Care must be taken to ensure that skills developed on training devices are reliably transferable to the actual system. Further, these skills must be those necessary for development of proficiency.

- CONCEPT: Testing will be designed to compare individual/collective performance of actual tasks after training on training devices. A comparison to training conducted exclusively on the real equipment and in mixes of devices and real equipment will be made. Costs to proficiency will be compared and use of training devices to reinforce and retrain decayed skill will also be measured.

26. Develop Training Programs to Conduct Continuous Combat

Not used in TEA 78

DEPARTMENT OF THE ARMY
HEADQUARTERS US ARMY TRAINING STUDY
FORT BELVOIR, VIRGINIA 22060

ATCG-ATS

24 MAR 1978

MEMORANDUM FOR RECORD

SUBJECT: TEA 78 Tests

1. Purpose: To record agreements concerning the TEA 78 Tests between the SWT and ARTS Gp and to provide for responsibilities for add ons or additional testing.

2. Agreed Actions:

a. M60A1/XM1 Tests

(1) The ARTS Guidelines for SWT Reports were accepted for implementation subject to any clarification which may prove necessary after further study.

(2) The following tests were reviewed and changed as indicated:

(a) Tank Crew Turbulence Research

1 Baseline correlation will include the five Armor Bns of the 1st AD.

2 Final reports will include:

a Tank crew turbulence test results, 10 Jun 78.

b Demographic data on firing crews (AIR) TBD.

c Results of train-up 11E (CDEC), 1 Jul 78.

d HumRRO Costs to proficiency 1 Jul 78.

3 Interface w/TEA 85 core objectives/variables has been accepted by ARI.

(b) Proficiency & Retention

ATCG-ATS
SUBJECT: TEA 78 Tests

1 Objective 3 is not being met. Units are not complying with requirements to record training from date of assignment.

2 Sample sizes are reduced from 300 to from 200 to 300.

3 Interim report date was deferred from early April to mid-April. Final report date was postponed to mid-June 78.

4 Variable 18 was added to T_I & T_S.

5 Core objectives A & B were deleted from T_A as unobtainable due to test design & unit noncompliance.

(c) Modular Training for RC.

1 Sample size was reduced from 108 TK crews to 90 crews in 3 Bns.

2 Table VIIC Scores were added to data.

3 All retention/decay deliverables were deleted as unobtainable due to test design.

(d) M60A1 WSTEA: The data from M60A1 WSTEA will be inputted to TXM to determine if a delta in force exchange does exist in a pure tank on tank situation. If a delta does exist, the data will be run in the CARMONETTE combined arms model to determine combined arms combat effectiveness.

(e) M60A1 Scaled Range Subcaliber test:

1 The Test was expanded to two phases: Phase 1 tests 40 crewmen of the 194th Armored Bde by firing a modified table IV and table VI; Phase II includes the original firing program, except that the the sample has been reduced from 480 to 400.

2 Phase 1 interim report data has been established as 30 Aug 78 with the final report completion estimated as 9 Nov 78. Report dates are contingent on start date of 15 May. This start date may conflict with AOB/BAT/BNCOC training.

(f) Training Time Ratio: No changes were made. COL R. Maxham provided initial test concept papers which will be reviewed by ARTS and coordinated with the ARTS Battalion Training Survey and General Survey.

(g) XM1 OTII: No change was made in the test objectives nor in the situational variables. It is clear, however, that ARI support to develop and field a test to determine core objectives/situational variables is necessary. Appropriate HRN has been submitted to ARI by ARTS through TRADOC DCS-T.

b. REDEYE Engagement Test:

(1) The ARTS reporting format was not accepted, by USAADS because much effort has already been expended in comparative data in the USAADS format. However, the modular data assembly concept will be complied with.

(2) It was agreed that an interim report would be furnished on 1 Jul 78. That report will be essentially a draft of the final report and will contain data available at the time that the report is prepared.

(3) The work sheets and summary sheets were updated and modified as follows:

a Update of the participating units to include 5ID, 7ID and 24 ID. The field testing schedule was also updated.

b. Variable 19 was modified to reflect that if would provide only insights into post-mobilization training.

c. TOW Tests:

(1) Delete Variable 11 from TOW/ITV Training Weaknesses as without an OSUT, the impact of an "expanded OSUT" is considered confusing. Same information will be apparent but in contex of "initial OSUT".

(3) Interface of TRASANA war model to core objectives/ variables should be addressed with TRASANA.

(4) Delete Variable 3 from TLAT test as USAIS conducts no institutional training for RC units per se. RC units can attend AC institutional training. The problem is in the semantics and the same information will be produced and reported.

(5) Variable 18 is defined as selection from any group, not CAT IV per se.

(6) Add Variable 25 to ITV test.

d. FO/Unit Training Tests:

(1) An interim report on test progress will be provided to ARTS as of 1 July 1978. This report will provide current status of the test and any data that is of significance and available on that date. It is recognized that available data will be limited because of the close proximity of the report to the data collection period. (15 May to 15 June)

(2) Three surveys/questionnaires/tests are involved in this test.

(a) FO Unit Training Management Survey -- This is to be administered as a structured interview at the unit. The required data collection from unit training records to be used for this interview will be forwarded to the unit in advance and the 12 months to be looked at will be specified.

(b) FO SQT format written exam on "Call for, and adjustment of fire techniques." This exam is to be administered to individual FO's.

(c) FO Questionnaire. This will develop opinions of the adequacy of the unit training programs as well as the demographic data on the test population.

(3) Changes to ARTS Summary Sheets. Variable 17 was removed from T_S because it is not really measured by the test procedures. Core B was reworded to reflect, "as reflected by unit training schedule information."

e. OFT CTEA w/expansion TEA 78 and 13 F Export Analysis.

(1) An interim report will be forwarded to ARTS as of 1 July 1978 providing current status and any data available on that date. It is recognized that, because of the late arrival of the OFT device at Fort Sill (30 Apr-15 May current projected time), and the late availability of classes for testing, only limited data will be available on 1 July 1978.

(2) Six separate surveys/questionnaires or tests are being used as part of this test.

(a) Institutional/unit background questionnaires. These will gather demographic and background data on test population.

(b) STEP Test. This standard math test permits random class groupings with respect to math aptitude.

(c) Observed Fire Exam. This exam was specifically developed to test level of knowledge of observed fire procedures prior to initiation of training as part of this test. This information will be used along with math scores to insure random placement.

(d) Institutional/Unit opinion questionnaire. This questionnaire develops the test population opinion of the training devices used as a part of the test.

(e) The final course exam on observed fire along with the live fire mission grades will be accepted as the proficiency level at the end of the training test being conducted.

(f) Instructor Questionnaire. This will develop the opinions of the instructors as to the effectiveness of the training devices being tested.

(3) There are several changes to the sample sizes. Changes to school class sizes from 120 to 200 for the officer class and from 20 to 20-50 for 13F classes, are based upon updated projections of class sizes. Changes to unit sample size reflect the addition of the approved support of 63 personnel for the basic OFT CTEA. Fort Sill is requesting 63 additional personnel from FORSCOM for the CTEA expansion. They would accept 33 additions if assured of the 30 from the ARTS effort. The desired sample size for the test is 125.

(4) Core C was modified to reflect a measure of proficiency only because the beginning and ending tests are not comparable and cannot be used to provide a delta measurement of proficiency. Variable 19 was modified to reflect insights into devices which might be used for RC training. It does not test RC personnel as such. Variables 3 and 5 more correctly belong in the 13F Export-Analysis and were deleted from the OFT CTEA expansion. They are listed in the 13F export analysis.

(5) Because the OFT CTEA includes a comparison of OFT, BT-33 and FOT to determine the most efficient and effectual device for training, an exportable package cannot be developed until the CTEA is completed and the best simulator determined

f. 63C/H CSS MOS Test

(1) The 63C/H test effort is proceeding IAW the December 1977 SWT plan.

(2) SQT administration for MOS 63C and H has been slipped by DA to the May-July 78 time frame. Computer processing will add a minimum of 6-8 weeks. As a result, comparison of SQT results with test data will not be available until August 1978.

(3) The identification of collective proficiency capabilities will become part of follow-on efforts to be completed after August 1978. This is an agreement with the December 1977 plan. This effort should be incorporated into TEA 85.

(4) Official USAOCCS agreement on the SWT/ARTS Deliverable Summary Sheets is limited to material appearing in the Test Activity column. While advice concerning the potential interface with TEA 85 has been provided, extension of the USAOCCS into TEA 85 will require specific tasking through TRADOC channels IAW the approved Five-Year Test Plan.

g. 05C/F MOS Test

(1) Subject to the availability of historical resource data, and unit training resource methodology, all 05C tests will encompass Resources to Proficiency in the ARTS Model.

(2) Regarding the comparison of self-paced and group-paced courses, Variable 25 was deleted because there are no training devices in either course.

h. CAMMS

(1) The ARTS Guidelines to SWT Reports were accepted for implementation and will be used to structure CAMMS test reports to ARTS.

(2) The CAMMS test was reviewed and the following changes were made:

(a) Test objective 1 was deleted and the following objective inserted: "Measure effectiveness of CAMMS as a training Method."

(b) Test object 4 was caveated to tie it to long term evaluations tied to use of the NTC.

(c) The interim report date was deleted as testing will not be completed until 15 May. The final report date for the short term effort was confirmed as 1 July 1978.

(d) All interface w/TEA 85 core objectives and situational variables were accepted subject to the following clarification: The short range study report of 1 July 1978 will cover only resources to level of proficiency attained. Data concerning programs to proficiency (number and interval between iterations), learning decay and frequency of retraining and validity of CAMMS skill transfer to actual operation can only be obtained in the TEA 85 program. In the interim, CATRADA/CAMMS will develop/explore and report the TEA 85 type issues to the level of resolution supportable by the data.

i. Cannon Crew Turnover

(1) The validation of this test was conducted on 17 March 1978. The test appeared to be well conducted with only minor problems which involved some additional training for scorers. Dr. Goldberg of ARI, is aware of this and will take corrective actions.

(2) The TEA 78 team will request a draft report of the results of this validation test from HQS ARI.

(3) The actual test is scheduled for August 1978 at Fort Lewis, WA, with two 9ID close support FA Bns.

j. TACFIRE POST OT III. The turbulence tests on TACFIRE OT III crews were not accomplished. Some limited data should be available by 1 July 1978 from tests on new crew members who will graduate from Fort Sill on 17 April 1978. Dr. Sanders, ARI field office, Fort Hood, TX, indicated ARTS should request a draft copy of both the ARI Post OT III report and the follow up turbulence tests from ARI, HQS. TEA 78 team has requested these reports.

3. Unresolved issues.

a. ARI acceptance of the TEA 85 objectives/situational variables is dependent on further study.

b. Final report dates for the demographic portion of the tank crew turbulence test must be coordinated w/AIR and Dr. J. Shields, ARI.

c. Command action is necessary to obtain support of FORSCOM/USAREUR commanders for the documentation of time/resources/training in support of the proficiency and retention tests.

d. ARTS must work w/the SWT to develop operation and scaling for the training time ratio test. These must be coordinated w/the Battalion Training Survey and the General Survey.

e. REDEYE Test. USAADS requires assistance in obtaining approval to visit the REDEYE sections of the Berlin Brigade during firing in Spain. There is a quota limitation on the number of US troops in Spain which will be at its upper limit during the period of the visit. USAADS/TRASANA will keep ARTS informed.

f. TOW TEA Ph results with "minimum" training program suggests TEA may stop after 90 missiles. Decision hinges on 23-25 March firings.

g. FO Unit Training Test. The support of this effort by TRASANA is still under negotiation between USAFAS, Fort Sill and TRASANA, White Sands.

h. CSS MOS 63C/H TEA.

(1) The initial planning estimate to complete the 63C/H effort was $23,000. Of this, $5,000 was funded locally and a request was forwarded to TRADOC for $18,000. TRADOC increased the travel allocation for the USAOCCS by $15,000. Funds in this amount were diverted to the ARTS effort from other USAOCCS funding allocations. TRACOC indicated that the additional $3,000 would be addressed at the FY78 BER.

(2) Due to the large amount of data to be gathered from each individual tested, it was determined during the validation testing that an additional day had to be added to the period of time spent in each division and that one person had to be added to the testing. Additional on-site test preparation time has also been determined to be necessary. This resulted in an additional cost of $5,300 which raised the total ARTS cost to $28,300.

(3) While the USAOCCS recently experienced a TRADOC-wide 10 percent cut in travel funds, the portion of this sum which applies to ARTS will be absorbed by the school by deleting other

high priority evaluation efforts. This still leaves a shortfall of $8,300. If the shortfall of $8,300 is not funded, testing planned at USAREUR, Fort Riley and Fort Hood (49th Armed Div) cannot be executed.

(4) DARTS support at TRADOC level to obtain these additional funds is requested. In the event these funds are not provided, DARTS guidance regarding changes to the test plan will be requested.

(5) If additional funding is not provided, 1st ID testing willbe cancelled. This would result in a reduction of the data base by 25%.

i. 05C/F MOS Test

(1) 05C/F OSUT start delayed until May. SWT estimates OSUT graduate data collection from 1 July-15 September. Accordingly, SWT estimates final report for this test to be 15 Sep 78.

(2) Due to travel fund constraints 05C testing in the 9th ID and 1st AD has been cancelled. Testing will be conducted in the 24 ID and 49 AD (ARNG).

j. CAMMS TESTING

(1) The sample size has been once again reduced from the original 10 Bns to 5. Of these, 3 are from 4th ID and 2 from 1st ID. This is caused by commitments of 1st ID Bn.

(2) CATRADA needs guidance from TRADOC as to implementation of CAMMS/NTC follow-on tests in TEA 85 so as to better coordinate & execute TEA 78 testing.

k. BATTLE

(1) TRASANA has no plans for using "BATTLE" in a test mode to determine what is taught through its use. It was agreed, however, that a test could be developed using the following concept.

a. Issues

1 How can BATTLE be adapted to a training role?

2 Stop action/on-line critiques.

3 Special operations - River Crossing, smoke, mine field clearing. Use of CAS, FA?

4 Standardized scoring procedures need to be developed.

5 Mission specific scenarios, attack, defend and delay need be developed.

6 A baseline for acceptable performance should be established.

7 Can we determine existing skills in weapons employment? (i.e. in use of tanks, armor use of infantry.)

b. Costs to play Battle per Bn Cmd Group. Time is 5-7 working days per Bn Cmd Group, with terrain board & computer.

c. Test sample size - 8-10 Bns tested twice each with a short time interval (2 weeks?) between tests.

d. Methods for measuring (quantifying) training value of BATTLE.

0. Play ARTEP and measure performance. (Cmd Gp module)

1. Questionnaire aimed at the basic question "what was learned during play of BATTLE?" (CATRADA doing this in conjunction w/DRS)

(a) Administered post play period.

(b) Cluster analysis of answer.

1a In parallel with step 1 develop by analysis a list of areas in which learning is expected to occur by playing BATTLE.

1b Take union of step 1 and 1a as the list for 2.

2 Develop standard test that can be used pre and post play that covers the list produced by step 1b.

3 Use data from BATTLE to check those clusters from step 1 and other elements from step 2 for which the data is applicable.

4 Play ARTEP and measure performance.

ATCG-ATS
SUBJECT: TEA 78 Tests

5 Use feedback to change BATTLE ARTEP or Pre-Post test.

e. Three options exist to execute the BATTLE test within context of TEA 78.

OPTION A

TRASANA design test (would cause delay in ongoing efforts for ARTS).

CATRADA conduct tests w/Cmd Groups

(CATRADA has three battle sets)

TRASANA Analyze Results.

OPTION B

TRASANA Continue to march for ARTS as per DPCS (under a revision to this DPCS as is currently being proposed by TRASANA)

CATRADA Execute entire program.

OPTION C

Either A or B above w/ARI designing test & assisting in analysis.

(2) TRASANA position on use of war models to CE.

(a) Analysts do not know which tasks should be incorporated in CARMONETTE and other models do not appear appropriate.

(b) Analysts need a list of SM/ARTEP tasks and varying levels of proficiency to put in the model.

(c) TRASANA management feels ARTS requirements should be integrated in the TRASANA Model Improvement Program. The Bn model improvement group works under TRASANA agis-Div Model group is under CACDA. This suggestion has been adopted and testing of "Battle" training value will be deferred to a follow-on period.

3. Actions/Decisions.

a. LTC Shambayer requested ARTS guidance (since ARTS is funding TEA 78 CAMMS) as to actions to be taken if one or more principal staff fail to report for CAMMS testing w/the Bn and Group. LTC Bloedorn decided that judgement must be used in all cases, but when it became clear that unqualified players or unacceptable absences would contaminate the data, that CATRADA should cancel and save the money, This policy should be announced during coordination sessions to assist unit commanders in assigning priorities.

4. Actions Required:

a. Action should be taken by ARTS/TRADOC DCS-T to schedule three additional combined Arms Bns for CAMMS testing ASAP to ensure minimum sampling by 15 May.

b. Coordination should be made with TRADOC DCS-T to determine when CATRADA will receive necessary guidance to ensure continuity between TEA 78 & TEA 85.

c. FO UNIT TEA/OFT/13F TEA 78.

(1) Validation of the 13F Course of Instruction must be accomplished prior to the test of the training devices. Because of shortfalls in 13F course fill, the COI's earliest validation will occur on or about 5 June. USAFAS must complete this validation procedure.

(2) Each of the OFT's can train 15 students per class. Plans call for 24 hours of instruction per class. This requires careful scheduling of the OFT's since only two are expected to be available. This also assumes minimum down time for the system. USAFAS must manage these factors and keep ARTS informed of slippage.

(3) Authorization message allowing Fort Sill to coordinate dates and arrangements with the field should be transmitted.

e. 05C TEA 78.

(1) A formal request to test in 24ID has been initiated by ARTS.

(2) SWT will update/finalize test plan and forward to ARTS ASAP.

ATCG-ATS
SUBJECT: TEA 78 Test

f. CSS TEA 78.

(1) Obtain additional travel funds or modify SWT test plans. DARTS support is needed at TRADOC level.

(2) Decision to modify test schedule should await TRADOC funding guidance.

5. Proposed ARTS Test Site Visits.

a. M60A1 Tests: TBD

b. REDEYE

(1) 24-28 Apr 78 - 8ID, Flint Hen, GER

(2) 24-28 Apr 78 - 101 ABD, FT Bragg, (RELS, LIVE REDEYE)

(3) 9 May 78 - 3 ACR, Ft Bliss, (RELS)

(4) 11-12 May 78 - 7ID, Ft Ord

(5) 14-19 May 78 - 9ID, Ft Lewis, (RELS)

(6) 16-23 Jun 78 - 2AD, 1 CAC Ft Hood, (RELS)

c. TOW test site visits: TBD

d. FO/OFT Test visit: TBD

e. CSS/63C/H Test visit:

(1) 17-20 Apr 78 - 8ID, USA EUR

(2) 12-15 Jun 78 - 49AD (ARNG) Ft Hood

f. 05C Test visit: 24ID TBD

for [signature] LTC, FA
GARY BLOEDORN
LTC, AR
CH, TEA 78 TM, ARTS

Appendix 2 to Annex A

Summary of TEA '78 Test Program

The test result summaries are presented in modular form in that each test has its own page or pages organized in the following manner:

a. Test status

b. Responsible agencies

c. Synopsis of test

d. Description of subtests.

e. Sample size

f. Summary of Results, Findings, and Conclusions

Index of TEA '78 Test Summaries

Armor Tests	Pages
a. Tank Crew Turbulence Test	A-1-1
b. Proficiency and Retention Test	A-2-1
c. Modular Training for Reserve Components, Transferred to TEA '79	A-3-1
d. Modified M60A1 WSTEA	A-4-1
e. Scaled Range Sub-Caliber Tests, Transferred to TEA '79	A-5-1
f. Training Time Ratio Survey	A-6-1
g. XM1 Operational Test II Transferred to TEA '79	A-7-1
Redeye Engagement Test	B-1-1
TOW Tests	
TOW Testing, Transferred to TEA '79	C-1-1

Forward Observer

FO Testing, transferred to TEA '79 D-1-1

03C/H

a. SQT as a Measure of Proficiency E-1-1

b. Proficiency Development Profiles E-2-1

c. Cost Effectiveness of Institutional and Unit Training Programs E-3-1

d. Optimum Distribution of Individual Training between Institution and Unit E-4-1

e. Determinations for Training Selected Personnel for Mobilization E-5-1

05C/F

a. Task Performance of Self-Paced and Group-Paced Graduates F-1-1

b. Proficiency of 05C/F Teams in Field Units F-2-1

c. Alternative Unit Training Programs, Transferred to TEA '79 Program F-3-1

Add on Tests

a. Anti-Armor REALTRAIN G-1-1

b. Rifle Squad REALTRAIN G-2-1

c. CAMMS G-3-1

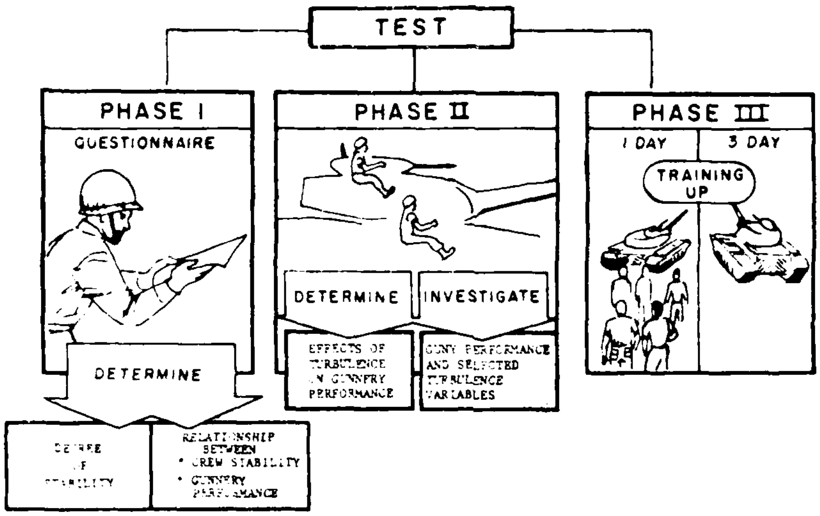
d. Training Instrumentation Evaluation (TIE), Transferred to TEA '79 G-4-1

e. Cannon-Crew Turnover, Transferred to TEA '79 G-5-1

f. Tacfire OT III, Transferred to TEA '79 G-6-1

g. Retention and Proficiency of Common AIT Skills, Transferred to TEA '79 G-7-1

EFFECTS OF TANK CREW TURBULENCE ON GUNNERY PERFORMANCE



a. Test status. As of 8 July, the test has been completed and results circulated in draft form. No further data reduction or analysis is contemplated.

b. Responsible agencies. The test plan was developed by the US Army Research Institute (ARI), Fort Knox Field Unit, as part of its FY 1978 work program. The research was expanded in response to a request by Director, Army Training Study, to determine the effects of replacing 11E tank crew members with non-11E crews assigned to an armor organization other than the baseline battalion. These tests were conducted by the Fort Knox Field Unit of ARI and HumRRO and were sponsored by the Commander, US Army Armor Center, Fort Knox, KY.

c. Synopsis of test. The test was conducted in three phases.

1. Phase I. A tank crew stability questionnaire was constructed to provide 22 measures of crew/crewman stability. This questionnaire was administered to participating tank commanders and their crewman separately to gain data on individual turbulence as well as crew turbulence. Questionnaire data was compared to tank gunnery performance data (i.e.,

Table VIII opening times on each engagement and hit or miss determination for main gun round engagements). Assessment of the effects of turbulence on crew performance was determined by correlating the results of Table VIII firing data with three variables: changing of crewmen between positions, changing soldiers among crews; and putting crews on unfamiliar tanks.

2. Phase II. The results of Phase I indicated a relation between a tank commander's position familiarity and gunnery performance and a relation between tank commander/gunner stability and gunnery performance. Causal relationships, however, were not clearly shown. The purpose of Phase II was to further investigate these causal relationships by artificially creating levels of turbulence to facilitate the evaluation of the effects on gunnery performance. To create the necessary levels and types of turbulence the experiment used four structured groups. Group one was the control group. The other three groups were experimental groups representing the different states of turbulence. Personnel in groups one, two, and three held 11E MOS and had recently completed Table VIII firing. In group 4, nonarmor crewman, drawn from support units normally available to the division, were assigned as gunners and loaders. The purpose of including Group 4 in this test was to determine the validity of performance based, individually paced, tank crewman skills training (TCST) concepts as applied to accelerated tank crew replacement training. These crewmen received three days of intensive training specifically designed to prepare them to fire Table VIII. The hypothesis was that such personnel, given a training module which includes maintenance training and tactical training, could become adequate tank crew replacements in post-mobilization emergencies. (Maintenance and tactical training not included in three-day program tested.) All members of group four were assigned to unfamiliar tanks and were unfamiliar to each other.

3. Phase III was conducted in the same manner as Phase II, except that a separate tank company was divided into two parts, one of which was given a one-day train-up and the other a three-day program.

d. Description of subtests.

1. Phase I constituted a subtest of the overall research. There were two objectives. The first was to determine the degree of stability in five armor battalions in USAREUR; second was to determine the relationship between crew stability and tank gunnery performance on Table VIII, at Grafenwohr, Germany.

2. Phase II was conducted with one Armor battalion in CONUS. The primary objective was to determine the effects of crew turbulence on tank crew gunnery performance and to study the effects of replacing crew members with nonarmor personnel. Concurrent with this was the development and evaluation of training programs for nonarmor replacements.

3. Phase III was the same type test except that training was for nongunnery qualified tank crewmen. The secondary objective was to test the relationships between gunnery performance and selected turbulence variables using the tank crew stability questionnaire (the same questionnaire used in Phase I).

e. Sample size.

1. Phase I. Sample size over five Armor battalions was 211 tank crews.

2. Phase II. Sample size for one Armor battalion was 52 tank crews for the stability questionnaire and four groups starting with 11 crews each for the firing data sample. Only 40 crews finished the test.

3. Phase III. One additional Armor company at Fort Hunter Liggett, CA, provided 16 additional crews. This company was divided into two test groups of eight tanks each. One group received a one-day intensive train-up program before firing and the other received three days of training. The study was conducted in two replications over a two-week period. Four crews from each group were trained and tested each week.

f. Summary of results, findings, and conclusions.

1. Summary of findings.

(a) The following significant findings were reported by ARI:

(1) There was considerable turbulence in the battalions evaluated. Complete crews had normally been together 1-2 months, while typical tank commander/gunner pairs had been together 2-3 months. Typical tank commanders (TC), gunners (Gnr), drivers (Dvr), and loaders (Ldr) had held their positions 12-36, 6-12, 6-10, and 3-6 months, respectively. Variation was great on both variables; i.e., length of time crewmen had worked together and hand been assigned to their positions.

(2) Both the experience of the TC and the Gnr in their positions were (QL1) positively related to performance. The more experienced TCs had shorter

opening times and experienced gunners had more hits.

(3) The longer the TC and Gnr had trained together, the shorter were their opening times. (QL1)

Significant Analytical Relationships

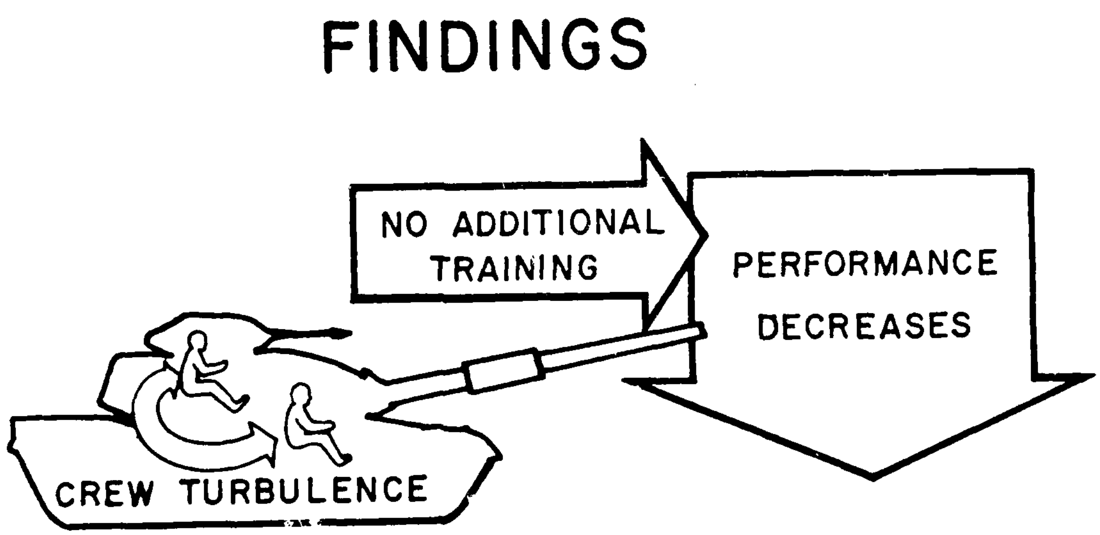
	Opening Time	Targets Hit
Months TC as TC	X	X
Months Gnr trained as Gnr		X
Months TC/Gnr trained together	X	

(QL1)

(4) Neither the time the whole crew had been together nor the experience of the driver or loader was related to Table VIII experience. This finding requires additional research as the Table VIII course did not test driver/loader crew interaction.

(5) Stabilization and training of tank commanders and gunners in their respective positions should be emphasized in unit training/management decisions.

Summary of Tank Crew Turbulence Test Results



2. Significant Army Training Study Findings. Analysis of the technical report data base reveals the following:

(a) The average crew in the five USAREUR armor battalions sampled had been assigned together 1-2 months as opposed to a mean of 5.0 months over the 10 battalions sampled one year later in the M60A1 WSTEA (6 USAREUR battalions/4 CONUS battalions). This indicates that either turbulence was worse in FY 1977 than in FY 1978 or that the Armor battalions studied in the M60A1 WSTEA had different personnel management programs. A similar relationship exists as to months the crews trained together. The M60A1 WSTEA mean was 3.6 months and the sample median under discussion was 0.8 months (Table I, Phase I, Descriptive Statistics, Page 12). (The median figure is used here because distribution for all items was positively skewed rather than normally distributed, leading to the conclusion that the median is the more appropriate indicator of central tendency). (QL2)

(b) Turbulence - gunner relationships are consistent with data reported in the TRASANA M60A1 WSTEA study with the exception that a stronger correlation linking probability of hit (Ph) to tank commander/gunner stability and experience is present. The confidence level of this finding is at alpha $\leq .05$. (QL1)

(c) While the results indicated no relation between the gunner performance and the time the entire crew had been together, indications are present that the longer the tank commander and gunner had trained together, the more rapidly they opened fire on their targets. Since crews were not required to fire on the move, the failure to relate driver/loader stability to gunnery performance may be more the result of an incomplete test than of driver/loader team performance. The study notes "Because engagements did not begin until the tank was in position, the driver's contribution to hits and opening time was limited." The M60A1 WSTEA Study comments support this contention by noting the inadequacy of Table VIII as a valid measure of effectiveness due to the lack of long-range targets and the lack of facilities to allow crews to fire on the move. (QL3)

(d) The need to stabilize the TC and gunners and the requirement for increased training of these key crewmen is supported by similar conclusions of the M60A1 WSTEA and the judgments of commanders expressed in the Battalion Training Survey (BTS). Further, endemic instability recorded in both Phase I of this study and the M60A1 WSTEA highlights the need for standardized training. The importance of training tank commanders with their gunners and the need to implement policies to stabilize these soldiers in position warrants prompt action. (QL4)

(e) Results indicate that unfamiliarity with duties of the tank commander and gunner has a serious effect on Table VIII gunnery performance. (QL3)

Group 1, the control group, was composed of crews which had recently completed Table VIII, in their normally assigned tanks. This group achieved a mean score of 1135 with mean main gun target hits totalling 5.4 with a mean of 10.8 seconds opening time. Group 2 was composed of crewmen retained in their Table VIII positions but within unfamiliar crews on different tanks. This group outperformed slightly the control group. Group 4, with rapidly trained non-11E gunners and loaders, also outperformed the control group. Only opening time was slower at 11.1 seconds as opposed to a mean of 10.8 seconds for the control group. Group 3, composed of trained 11E crewmen serving in unfamiliar positions, was markedly poorer in gunner performance. Group 3 tank commanders had been replaced by their gunners, and gunner positions were filled by loaders. Driver and loader positions were filled with men who had held those positions during the recently completed gunnery program. Group crewmen had not previously worked or trained together. The mean gunnery performance as a function of group assignment is shown at Figure 1. (Tank crew turbulence test (draft) ARI, June 78, Page 34)

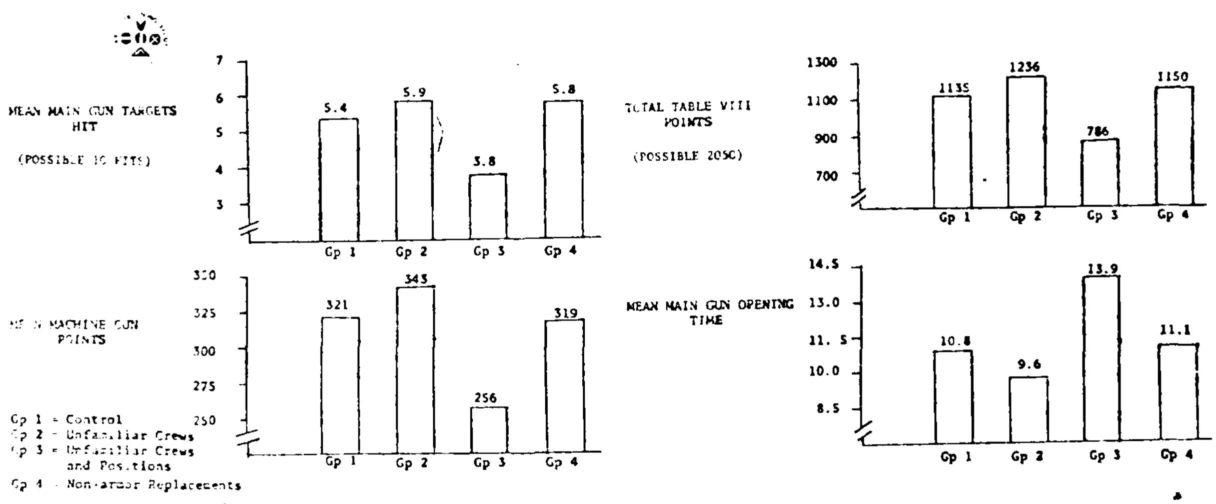


Figure 1 Tank Gunnery Performance as a Function of Group Assignment

(1) Results highlight the following trends. Additional tests will be required to confirm these findigs.

a. Whole crew personnel familiarity did not have a significant effect on gunner performance.

1. Experience in a particular position appears as a significant (QL4) factor in gunner performance.

2. The findings in Phase I were supported in that added emphasis on training and stabilizing tank commanders results in increased gunnery performance.

3. Changing a crewman's duty position without training him for his new duties leads to markedly reduced performance.

4. The armor crewmen of the test unit were not adequately trained to assume their new positions.

5. Incorporation of nonarmor personnel into crews as gunners and loader did not degrade gunnery performance. <u>Baseline gunnery performance, however, was well below acceptable standards.</u>

6. Crew unfamiliarity with the specific tank used on Table VIII appear to have only limited impact on gunnery performance. This may have been because baseline turbulence was such that few crews in the tested unit could have train for long periods on an assigned tank.

b. That more research is required to determine the degree to which turbulen affects peformance on less structured tasks such as Table IX and the ARTEP.

3. Phase II unit training costs. This recapitulation covers the training cost for the armor battalion to conduct the tank crew modular training program (TCMTP). Group IV (Non-11E gunners and loaders) costs of the Tank Crew Skills Training (TCST) program are listed separately and are included in total costs. Costs of turbulence testing have not been included in order to portray tank battalion tank gunnery costs in isolation from test activities. This is believed to be the more meaningful data. The overall cost of the three-day modular training program, including costs of people, ammunition, and POL, is depicted in Table 1. Class IX fixed and variable base operations costs could no be determined due to the short duration of the test and small sample size.

Activity	Personnel Costs (Incl MPA)	Ammunition Costs	Miles Driven M60A1	Miles Driven Other	Gallons POL M60A1	Gallons POL Other	Total
*Pretest	7,136.99	—	240	—	300	—	7,265.9
Table V	28,859.65	70,458.66	4320	4050	5400	887	102,025.2
Table VII	58,962.99	442,535.40	9720	6020	12,150	1474	507,362.9
Table VIII	64,164.25	164,385.72	864	6720	1080	1474	229,634.5
Group IV	14,984.27	25,779.27	1177	639	1471	90	41,436.5
Post-test	5,750.53	—	80	—	100	--	5,793.5
Total Cost	179.858.69	705,159.05	16401	18129	20501	3925	893,538.1

Table 1: Overall Cost of Tank Crew Modular Training Program.

*Costs of HUMRRO Analyst's pay.

4. Significant Army Training Study finding from Phase II. Analysis of the technical report data base reveal the following:

(a) The level of turbulence within the Phase II test battalion in CONUS is consistent with turbulence levels reported in the M60A1 WSTEA study. Turbulence of this magnitude at the crew/platoon level may have precluded the establishment of an adequate baseline from which to measure the effects of turbulence on tank gunnery performance. In other words, the potential performance of crews which have been stabilized through a series of tank gunnery programs in unknown. This conclusion is reinforced by analysis of crew performance in both studies wherein all groups fired considerably below design capability. The Phase II baseline group in this study exhibited a combined Heat/Armor Piercing Discarding Sabot Ph mean of .536 while firing Table VIII the second time. The combined Heat/APDS Ph mean of the four CONUS battalions studied in the M60A1 WSTEA (which includes the data of the Phase II baseline crew performance) is 0.42. All battalions fired the same range with scores compiled by the division tank gunnery assistance team. An additional long-term study is required to establish the potential performance of US M60A1 units by testing the effects of stability on tank gunnery performance. This study should be conducted on range facilities which permit full crew interaction in the engagement sequence; i.e., shoot on the move. Such facilities, available (QL4)

at Fort Bliss, TX, are now being used for the XM1 OT II. This effort would confirm or deny the study findings concerning the effects of loader/driver turbulence on crew performance and highlight the TC/gunner relationship.

(b) The M60A1 WSTEA supports Phase I findings that tank commander stability is significantly related to crew hit performance. Phase II, Group 2, however, outperformed the baseline group. Because previous finds are supported by a much larger sample (15 battalions versus 11 crews), it is concluded that the Phase II, Group 2 performance is attributable to chance. (QL3)

(c) Leader dominance appears to emerge as the single most important aspect revealed by both studies. In the M60A1 WSTEA, past success by tank commanders correlated with higher performance. In this study, all groups retaining experienced tank commanders in their positions significantly outperformed the one group (Group 3) where the commander was replaced by the gunner. Four major lessons emerge: (QL3)

(1) Emphasize training of leaders.

(2) Institute additional train-up of other crewmen in TC duties. Cross-training between gunner/loader and drivers is useful, but train-up appears to provide greater battlefield redundancy.

(3) Provide adequate training to any crewman occupying an unfamiliar position before expecting him to perform the job. Modular training packages, such as those used with Phase II, Group 4 and in Phase III, should be employed to train-up 11E (19E/F) non-position qualified crewmen as well as non-11E (19E/F) replacements.

(4) A need for standardization is indicated. All battalions, companies, and platoons, conduct gunnery programs somewhat differently and few exhibit expected levels of proficiency. As an example, Table VIII range facilities in USAREUR did not provide target ranges greater than 1425 meters. Consequently, all main gun engagements were conducted using battefield gunnery techniques (battle sight gunnery). In CONUS, targets at ranges in excess of 2000 meters required crews to employ precision gunnery techniques (using the rangefinder) for a number of engagements. In USAREUR, each battalion conducted table VIII as desired by the commanders concerned in accordance with a general prodcedure established by USAREUR. This procedure allowed platoon leaders to score their organic crews with the aid of pop-up targets to establish target effect. In CONUS, division level tank gunnery assistance teams scored all crews. No pop-up targets were available and, thus, variations in discriminating doubtful rounds from target hits must be considered possible. Results of (QL4)

the Tank crew baseline firing of Table VIII by all groups during the turbulence study reveal that despite the training, no group of crews--experienced or inexperienced--demonstrated a level of crew gunnery experience that could be viewed as combat ready. Qualification rates ranged from 20% to 40%. Even the most liberal measure of percent of targets high reveals group performance did not range beyond 60 percent. This is consistent with data reported by TRANSANA in the M60A1 WSTEA wherein it was estimated that tank crew performance was 40% to 50% below potential combat effectiveness. The need to train tank crews to proficiency rapidly in emergencies is clear. The performance of Phase II, Group 4, indicates that standarized training and procedures can, in large measure, compensate for the adverse effects of instability. (This group was given 3 days of highly standardized training amd subsequently demonstrated the same level of performance as the baseline group. It should be noted however, that the baseline proficiency was low.)

(d) While neither this study, nor the M601A WSTEA, measured the effects of lower mental group soldiers on performance, the Armor Retention Study and the Redeye Study indicate that lower mental category soldiers do not retain proficiency as well as higher mental category troops. The Armor Retention and Proficiency Study sample revealed that 83.4% of the 11E crewmen entering the force during the period Jan-March 1978 were mental categories III and IV. (Learning and Retention of Basic Armor Skills within the institution USAARMC, Fort Knox, Ky, May 1978 page 25). This indicates that the tested units may have had a large percentage of lower mental category crewmen. If so, the low crew performance may be partially attributable to this as well as turbulence and inadequate unit training programs. Such a conclusion would be consistent with trends established in the referenced studies. (QL4) (QL3)

5. Phase III. Summary of finding.

Initial anaylsis of the data is listed below.

(a) Overall, three of the 16 crews qualified.

(b) Of the three qualifying crews, one was from the 3-day training group and two were from the 1-day. All were from the first week of training qualifying crews.

(c) When scored in terms of the percent of total engagements successfully fired:

(1) The crews averaged 37% main gun hits overall. (QL4

(2) Averaged over the two training periods the 1-day group did slightly better than the 3-day group. (QL4

(3) Averaged over training groups (1-day and 3-day), those from the first week did substantially better than those from the second. (QL4)

(4) The 1-day group did better than the 3-day in week 1; the 3-day group did better that the 1-day in a week 2. (QL4)

(5) Indications were that the crew involved in the first week of training were more experienced than those in the second week. (QL4)

(6) Indications were that the 1-day group was slightly more experienced than the 3-day. (QL4)

(7) Training was much better the second week than it was the first. (QL4)

(8) The Table VIII used was that newly drafted by the Armor school. Firing and scoring requirements were more severe than the requirements in Phase II Tank Crew Turbulence Test. (QL1)

(d) Tabular data from Phase III firing is displayed in Tables 2 thru 4. -Differences in performance are not statistically significant due to the small sample size.

TRAINING	TRAINING GROUP		
WEEK	3-DAY	1-DAY	TOTAL
1	1/4	2/4	3/8
2	0/4	0/4	0/8
TOTAL	1/8	2/8	3/16

Table 2. Relative Number of Crews Qualifying on Table VIII By Training Group and Training Week

TRAINING	TRAINING GROUP					
WEEK	(N)	3-DAY	(N)	1-DAY	(N)	TOTAL
1	(4)	3.25	(4)	4.75	(8)	4.0
2	(4)	3.0	(4)	2.5	(8)	2.75
TOTAL	(8)	3.125	(8)	3.625	(16)	3.375

Table 3. Averaged Number of Table VIII Engagements Sucessfully fired (TGTS HIT)

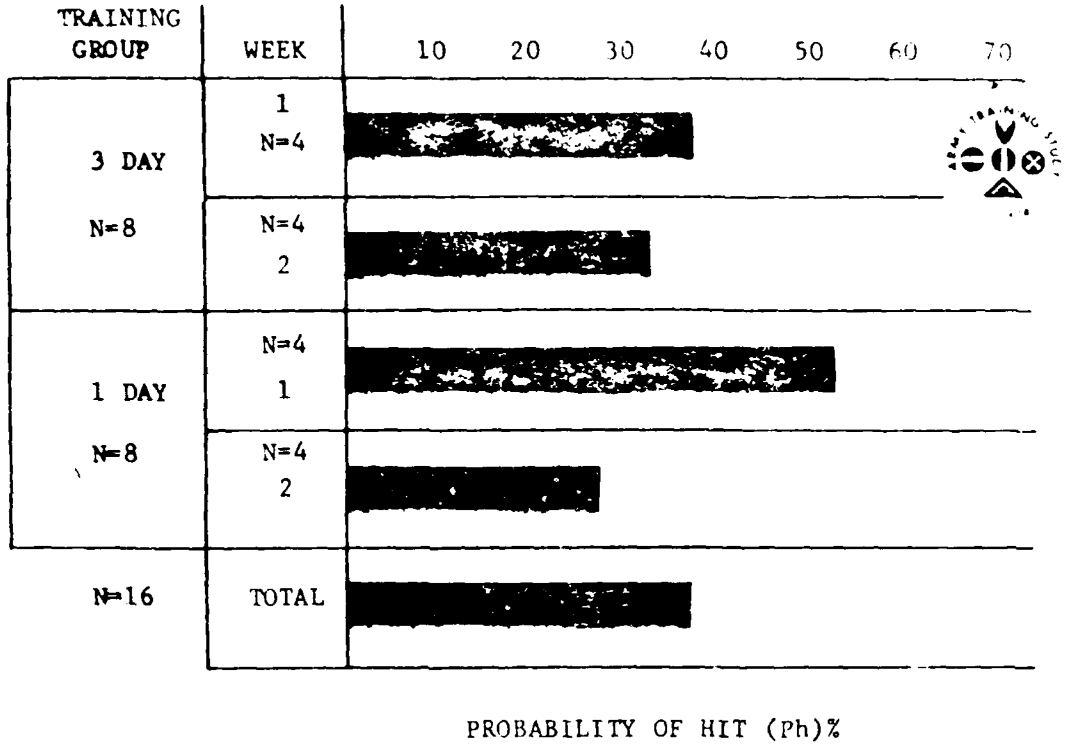


Table 4. Proportion of *Table VIII Main Gun Hits* (Ph) by Training Group and Week (QL1)

(e) The following lessons learned were reported by personnel conducting the Phase III test:

(1) Individual readiness training should be instructor managed. Self-instruction to the point of self-management is not recommended. this dose not imply to the need for complete one-to-one training, but it does imply that a minimum individual entry skill-level be tested by an instructor, who then assigns/signs-off on criterion performance. (QL4

(2) Individual readiness training should be closely tied to crew training requirements. Individual skill requirements should be carefully derived from crew skill requirements which, in turn, should be derived from unit performance criteria, such as Table VIII and IX and ARTEP. (QL4

(3) Individual readiness training should rapidly progress to crew readiness training. *Trainees should begin team* exercises (two-man, three-man and full crew) just as soon as minimum qualification on individual skills is achieved. this is especially important when training time is short. (QL4

(e) Maximum use should be made of dry and sub-caliber firing exercises. Though the adequacy of substitutes for service firing is not yet well documented, ammunition costs discourage frequent live-fire exercises. Because repeated intensive gunnery drills are necessary to achieve proficiency, the use of dry, sub-caliber or other simulted forms of gunnery training are recommended. (QL4)

Additional work on TCST is necessary. Except for the readiness tests, the program in its present form is little more than a detailed outline for training. Many of the training aids, devices and materials recommended have not been developed. Also, variations of the program necessary to accommodate different training conditions and resources need to be more systematically planned and evaluated. (QL4)

(f) Training Implementation. The most significant implication of the work done to date with TCST pertains to strategies for implementation. The quality of a training program is probably much less important than the care with which it is implemented or the motivation of the trainers and trainees. (QL4)

(g) Limited planning time and resources and the urgency of on-going training schedules precluded the kind of controlled intervention required for program evaluation. The forms of training being studied were not designed as systematic variants of TCST; tank crews were selected on the basis of availability rather than suitability; those who did the training differed in background, motivation, and familiarity with the program; and live-fire criterion tests were not comparable from Phase II and Phase III. In short, study objectives, and evaluation criteria accomodated the physical and personnel resources available in each case. Moreover, some data were not collected that should have been, and other data were incomplete, missing, or unusuable. Despite these shortcomings, some conclusions and implications are warranted. Some are based on data collected and other on informal observations or "lessons learned." They are presented under the headings of training need, training results, the training program, and training implementation. (QL4)

(h) Tank crew skills training program. (TCST) is in need of further development and evaluation. Principal design features are, however, sound and are to be recommended for any such tank crewman skills training program: (QL4)

(1) Individual readiness training should be individualized. Since there is considerable variation in the entry level skills of trainees, it is important that each block of training be adapted to the needs of the individual. This should be diagnosed by pretesting on all skills unless trainees are known to be totally untrained.

(2) Individual readiness training should be performance based. All training, whether knowledge or hands-on, individual or crew, should begin with a pretest to determine what the individual or crew can and cannot do. More importantly, an individual/crew should not be advanced from a module or block of instruction until proficiency has been demonstrated in a post-test.

(i) The overall costs of the one-day and three-day training modules and Table VIII Firings are depicted at Table 5. (Rounded to nearest dollar)

Activity	1st week	2d week	Total
Personnel (Incl MPA)			
Tank Crews	$9,721.00	$825.00	$17,926.00
Support	10,615.00	7,615.00	18,230.00
Subtotal	20,336.00	8,640.00	36,156.00
Ammunition			
Subtotal	37,652.00	37,652.00	75,304.00
POL			
M60A1 Tanks	172.00	129.00	301.00
Support	99.00	97.00	197.00
Subtotal	$271.00	$226.00	$498.00
TOTALS	$58,259.00	$53,696.00	$101,955.00

Table 5. Overall costs of 1-day/3-day training modules

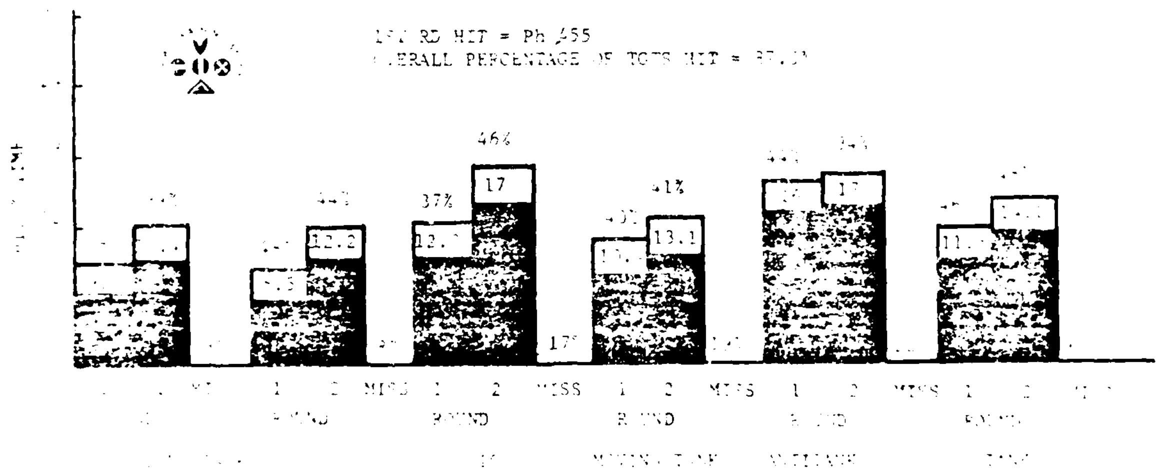
c. Significant Army Training Study Findings from Phase III.

(a) While the sample size precluded collection of statistically significant data, the results are consistent with Phase I and III findings and with M60A1 WSTEA data.

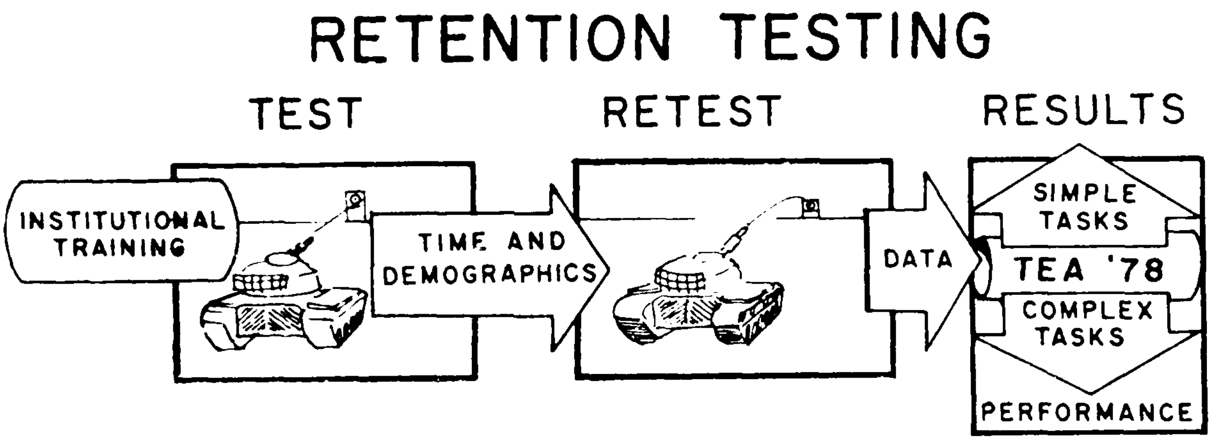
(b) Modular training was relatively successful when conducted by more gunnery experienced tank commanders. Phase III results were less successful. Two major differences exist. In the earlier effort, experienced TCs trained novice gunners and loaders. In this situation, non-gunnery qualified TCs taught non-gunnery qualified (but tank

experienced) gunners and loaders. Secondly, the less experienced TCs were then required to lead the crew through a more difficult Table VIII. Viewed from this perspective, the results in Tables 5 and 6 could be interpreted as reinforcing the importance of training TC/gunners together and the role of the TC as key to crew gunnery performance. However, other interpretations are also possible. For this reason, final conclusions should be deferred until the proposed TEA '79 tank crew stability test is completed.

(c) While success of modular training has to date been modest, indications that the concept has promise, are reinforced by the reported experiences of the US Army Armor Center in training basic officers to tank crew gunnery proficiency. By emphasizing gunnery training, focused on crew performance criteria, the Armor Center is training crews composed entirely of basic officers. Firing from tanks used by all trainees, these officer crews are demonstrating a level of proficiency superior to the average tank crew in USAREUR and CONUS and approaching the design capability. While direct comparisons are not appropriate due to the differences between training programs, environment, motivation, conduct of Table VIII, and between mental category of crewmen, these results are important. This data tends to confirm the level of performance potential of the M60A1 system with well trained, motivated high quality personnel. Armor officer basic crew performance data is shown at Figure 2 below.



Retention of Basic Armor Training Skills Within the Institution and Unit,



a. Test status. As of 31 July 1978, both the institutional and unit parts of the study have been completed and the results published in final form.

b. Responsible agencies: Test plans were developed by the 1st Training Brigade (Armor), Fort Knox, KY. The Army Training Study System Work Team at Fort Knox,KY, in coordination with the Fort Knox Field Unit of ARI, refined the study plans and assisted in the conduct of the test. The overall study was sponsored by the Commander, US Army Armor Center, Fort Knox, KY.

c. Synopsis of test:

1. The basic design of the study was: Given that a soldier has passed all performance measures on the mid-cycle test and Tank Skills Qualification Test (TSQT) in order to graduate from Basic Armor Training (BAT), he was followed to his first unit and was readministered the same tests under the same conditions and to the same standards in order to determine loss of proficiency. Examinees were personnel in selected units who had graduated from BAT during the period 16 December 1977 through 17 March 1978. Mid-cycle and TSQT score records were available for these

graduates. Thus, personnel were retested from two to twenty-five weeks after graduation.

2. Performance by Demographic Categories. The demographics analyzed were age, marital status, mental category, education level, and career intention.

3. The performance measures selected were representative samples of critical basic armor crewman skill level one performance requirements. Test areas included testing loader's duties, machines guns, breechblock, tank gunnery, general subjects, communications, maintenance, advanced driving, small arms, and first aid.

d. Description of Subtests - None

e. Sample size.

1. Institutional Acquisition and Retention Testing: A total of 436 personnel were tested and later retested; 286 on the mid-cycle and 150 of these were retested on the end-of-cycle TSQT.

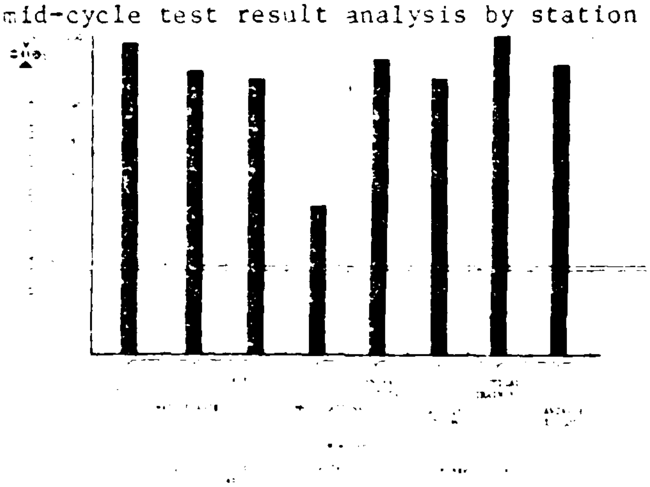
2. Unit Retention Testing: A total of 270 personnel were tracked to the unit and retested for retention.

f. Summary of results, findings, and conclusions.

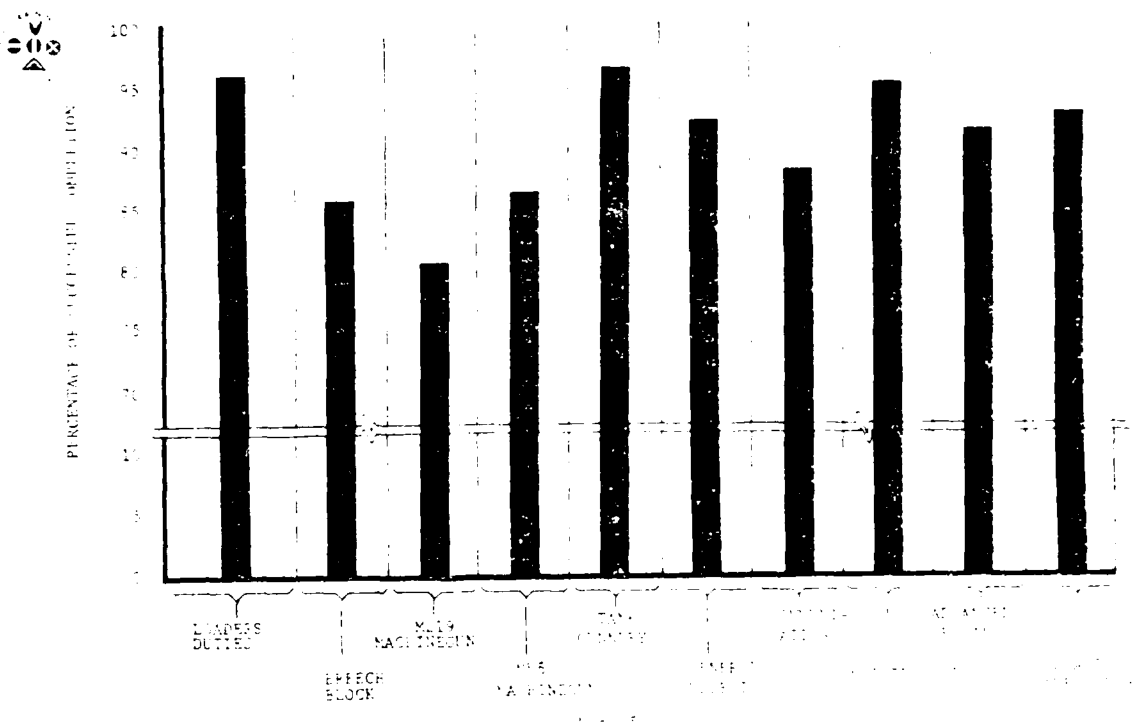
1. Summary of Findings: The following significant findings were reported by the ARTS SWT:

(a) Institutional Testing:

• Approximately 96% of the BAT graduates had demonstrated the requisite proficiency on all test items prior to graduations. Figure 1 below depicts mid-cycle test result analysis by station and overall. (OL3)



• Results comparing mid-cycle test scores (Go No Go Criteria) indicate that individual proficiency was much greater on those tasks involving fewer subtasks. Retention was reducted on those tasks involving multiple, precise, sequential subtasks and cognitive skills such as communications. While it is logical to assume that No Go's would be attained more often on tasks which involve more subtasks, the fact that the more intricate tasks involved interrelationships any one of which could cause a No Go should not be ignored for actual skill complexity itself could have been the cause of many of the No Go's. Results of testing on the end of course Tanker Skills Qualification Test are shown at Figure 2 below:



(QL4)

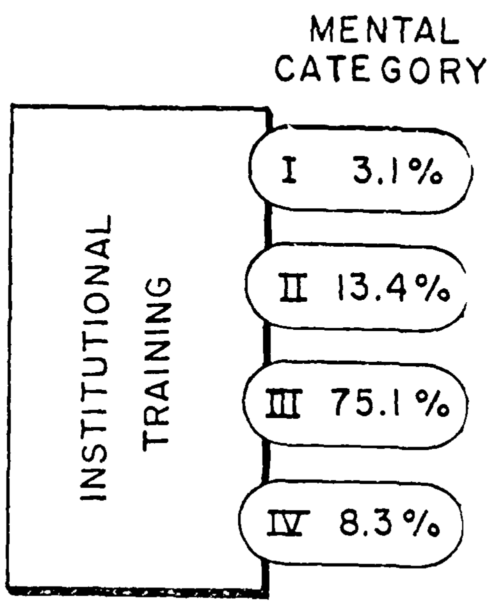
• Retention testing of both the mid-cycle test and SQT quality indicte that:

• A high degree of learning takes place within the institution. On average, 96.7 percent of mid-cycle and 96.1 percent of TSQT performance responses were "Go" at the first try. (QL3)

• Data indicates that communications tasks were least well learned. (QL3)

• Overall, comparing mid-cycle results with TSQT end-of-cycle results, it is concluded that performance retention is high for three weeks in the institution. (QL3)

• Distribution of 436 examinees across mental categories was I - 3.1%, II - 13.4%, III - 75.1%, and IV - 8.3%. Approximately 66 percent of the examinees were high school graduates even though 83.4% were in the lower mental groups. (QL3)



• That lower mental groups require more training to maintain proficiency. Overall retention performance in the institution by mental categories is shown in figure 3 below: (QL3)

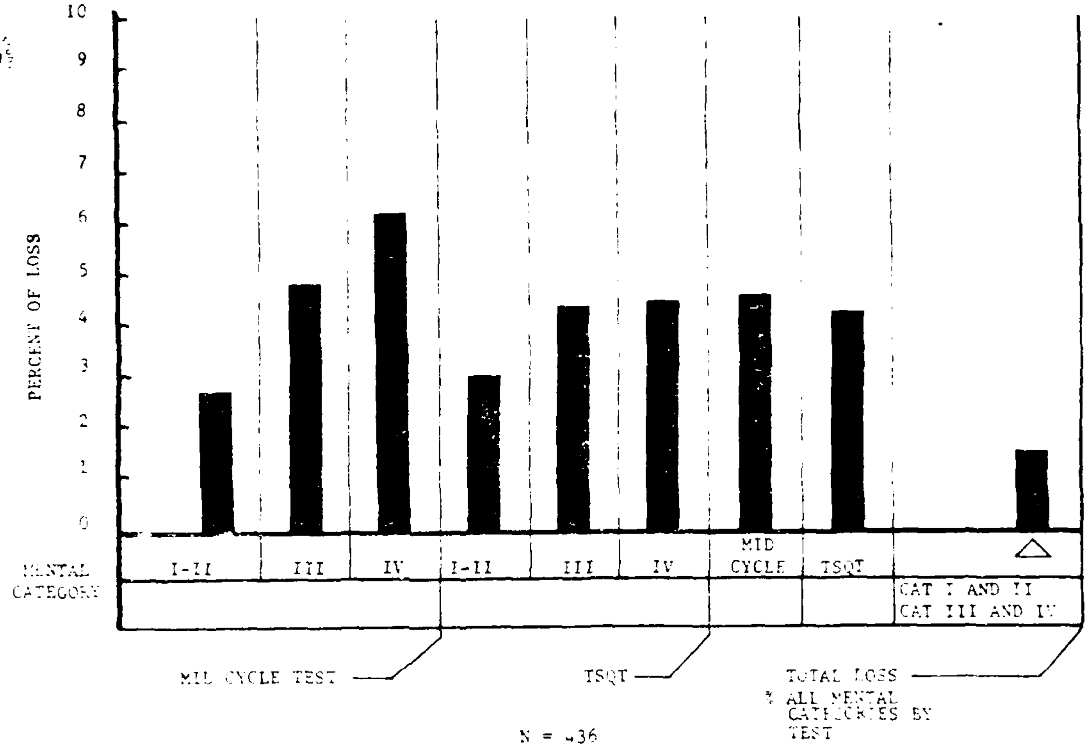


Figure 3. Mid-cycle and TSQT Overall Retention Loss Results (%) by Mental Category (QL4)

(b) Proficiency and Retention Test Costs

• Resources: A cost study was accomplished in conjunction with the proficiency and retention study in the institution. These costs were developed for the 11E and 19E/F training programs as used within the 1st Training Brigade, Fort Knox, KY.

• Costs were grouped into 18 categoreis to allow specific lesson plans to fall entirely into a category. Training time not included in a lesson plan category was identified separately. Study assumptions included;

• Trainee strength was the optimum design fill (11E, 15B, 19E/F - 156 in 6 equal platoons.

• Trainee grade structure was based on normal rank distribution and rank of trainer was the authorized rank from the current TDA.

• Other assumptions, guidelines, and data-sources were as approved by the TRADOC Comptroller and were in accordance with ARTS Training Resources Methodology.

• Cost summaries for OSUT 11E10/19E10/19F10 with aggregate numbers of trainess as summarized by MOS in the following cost summaries.

FY 1977 Cost Per Trainee 13.0 Weeks

(Norm Grad 5,189)

Course Number/MOS 11E10 OSUT

Direct Costs	OMA	MPA	PA
1. Mission Costs (814711)	548	1,408	-
(a) Pay	275	1,408	-
(b) TDY	1	-	-
(c) Supplies & Equip	270	-	-
(d) Other	2	-	-
2. Ammunition			526
3. Trainee Pay & Alw (E-1)		1,565	
4. Travel Pay to Course		125	
5. Total Direct Costs	548	3,098	526
Indirect Costs			
6. Base Op (.B000 - .P000)	1,052	276	
7. Support Costs			
(a) Training Aids	42	5	
(b) Other	91	64	
8. Total Indirect Costs	1,185	345	
9. Total Direct & Indirect Costs	1,733	3,443	526

Aggregate - 5,702

Table 1. FY 1977 Cost Per Trainee MOS 11E10 13 Week Course

FY 1977 Cost Per Trainee 14.0 Weeks

Course Number/MOS 19E10 M60A1 Armor Crewman

Direct Costs	OMA	MPA	PA
1. Mission Costs (814711)	547	1,516	-
(a) Pay	296	1,516	-
(b) TDY	1	-	-
(c) Supplies & Equip	275	-	-
(d) Other	2	-	-
2. Ammunition			1,443
3. Trainee Pay & Alw (E-1)		1,685	
4. Travel Pay to Course		125	
5. Total Direct Costs	547	3,326	1,443
Indirect Costs			
6. Base Op (.B000 - .P000)	1,285	294	
7. Support Costs			
(a) Training Aids	54	5	
(b) Other	98	69	
8. Total Indirect Costs	1,437	368	
9. Total Direct & Indirect Costs	2,011	3,694	1,443

Aggregate - 7,148

Table 2. FY 1977 Cost Per Trainee MOS 19E10 14 Week Course

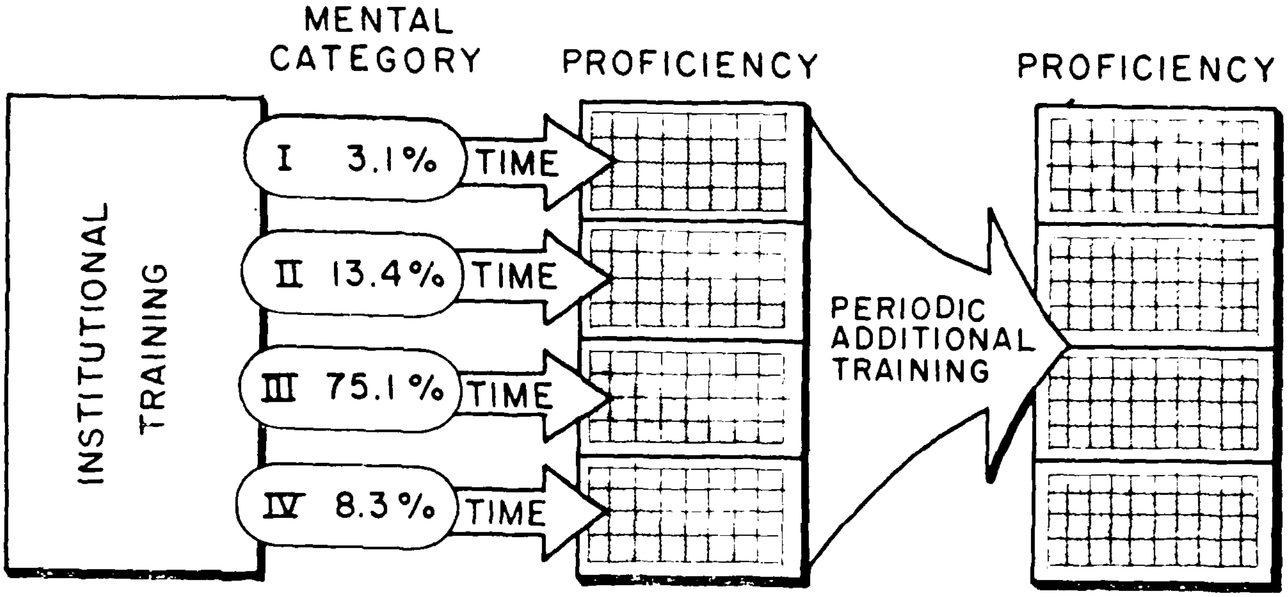
FY 1977 Cost Per Trainee 14.0 Weeks

Course Number/MOS 19F10 Tank Driver OSUT

Direct Costs	OMA	MPA	PA
1. Mission Costs (814711)	1,369	1,516	-
(a) Pay	296	1,516	-
(b) TDY	1	-	-
(c) Supplies & Equip	1,070	-	-
(d) Other	2	-	-
2. Ammunition			86
3. Trainee Pay & Alw (E-1)		1,685	
4. Travel Pay to Course		125	
5. Total Direct Costs	1,369	3,326	86
Indirect Costs			
6. Base Op (.B000 - .P000)	1,216	294	
7. Support Costs			
(a) Training Aids	54	5	
(b) Other	98	69	
8. Total Indirect Costs	1,368	368	
9. Total Direct & Indirect Costs	2,737	3,694	86

Aggregate - 6,517

Table 3. FY 1977 Cost Per Trainee MOS 19F10 14 Week Course



SUMMARY RETENTION IN UNITS

2. *Unit Retention Testing Summary of Findings Reported by* ARTS SWT:

• Personnel were able to perform properly (i.e, receive (QL3) a "Go" on about 80 % of basic armor skills, two to twenty-five weeks after their assignment to the unit.

• The types of skills showing relatively low performance levels were map reading, M85 machine gun and breechblock tasks. The majority of "No Go's" related to failure on tasks requiring cognitive skills involving reading, interpreting and remembering, and sequential skills, indicating that these types of skills are forgotten most rapidly. This finding is consistent with the institutional portion of this study which found that cognitive and sequential skills were most difficult to learn.

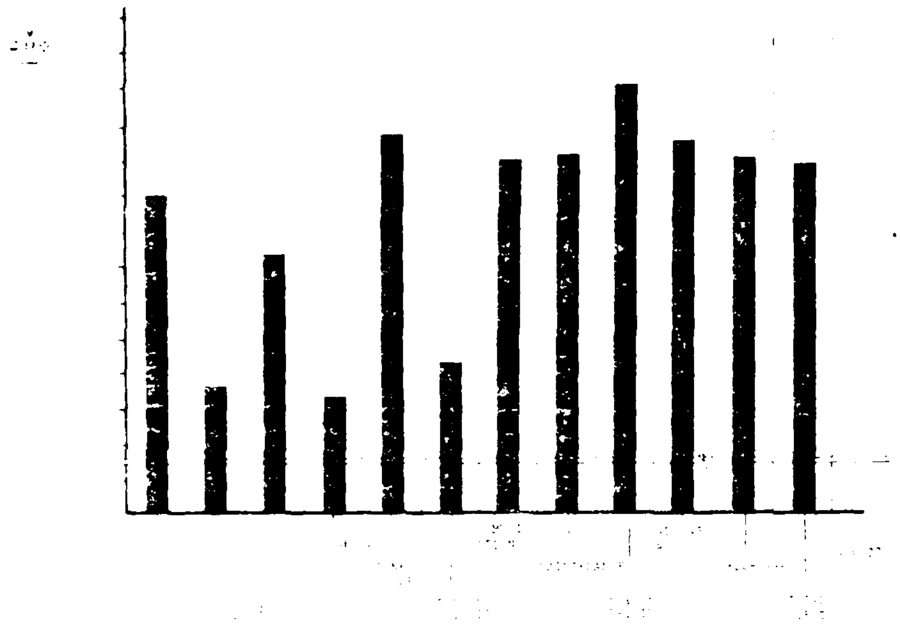
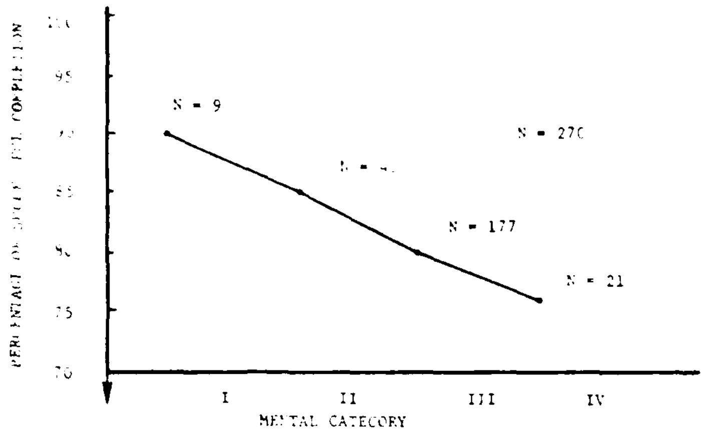


Figure 4. Average Percent Go by Test Stations in Unit. Loss Over Time 2-25 Weeks in Unit (QL4)

• The only demographic variable significantly related to retention was mental category. Lower aptitude personnel performed at a significantly lower level overall, and their difficulties were concentrated in cognitive tasks involving memory retrieval and decision making. This is consistent with trends and indicators reported in the institutional study as to performance by lower mental category personnel. These categories totaled 79.2% of this sample of 270 examinees. The scarcity of mental category I & II personnel and the preponderance of mental category III personnel (70.8%) are typical distributions of the armor trainee population at this time. (Chapter V, page 15.) Figure 5 below depicts performance loss by mental category. (QL3)



Performance Loss in Units by Mental Category (QL3)

• No correlation was found between time from BAT to arrival in a unit, and retention. (QL3)

• A large percentage of troops (25%) had not been assigned to a tank since joining the unit. Further, 28.5% indicated that although assigned to a tank they had not been assigned a crew position. Thus, 53.5% of the 270 man sample had not been assigned specific crew duties. (Chapter V, pages 5 & 6) (QL3)

• Training in the unit did not correlate positively with retention of proficiency except that the 36.7% who had used TEC did exhibit slightly higher retention. However, use of TEC was not widespread. In all cases, those who reported use of TEC had done so only once or twice. (Chapter V, pages 8-9) (QL3)

(3) ARTS Summary of Findings: (QL2)

• The demonstrated loss of proficiency by mental category III and IV examinees is consistent with trends identified in the 63C/H Test, the Tank Crew Turbulence Test with judgments expressed by commanders on the ARTS Battalion Training Survey to the effect that low mental category personnel require additional training to maintain proficiency. In this context, additional training means more frequent repetition of refresher training in cognitive and sequential type tasks in order to sustain acceptable levels of proficiency.

• The lack of unit training program effectiveness on (QL3) retention is consistent with similar findings in the 63C/H Test and with probability of hit (Ph) data reported in the M60A1 WSTEA and Tank Crew Turbulence Test. The fact that all examinees had demonstrated proficiency in most tasks while in the institution indicates that lower mental category personnel are able to master basic armor skills but require good, well planned and executed reinforcement training in cognitive and sequential tasks more frequently than the participating units are providing.

• The high density of lower mental category personnel (QL4) entering the armor force indicates a need to emphasize job performance aids, more frequent training, use of instructional technology and detailed testing during developmental testing. This is especially true of the future, as the Tank Crew Turbulence Test and M60A1 WSTEA have identified the dominance of the tank commander in crew gunnery performance. It is precisely this position which most requires cognitive and sequential skills which decay the fastest for lower mental category personnel. Because the lower mental categories form the bulk of armor entry level soldiers it seems probable that they may form the bulk of the tank commanders in the future.

• The high percentage of soldiers who had not been (QL4) assigned a tank or had not been assigned a specific crew position is consistent with the high degree of turbulence and not present for duty data collected during the ARTS "Best Battalion" costing effort as well as the Tank Crew Turbulence and M60A1 WSTEA studies. However, since the results indicate that increased experience in a tank crew (at least up to 25 weeks) did not lead to improved performance, unit training will have to improve in quality and quantity before this malassignment training distractor becomes dominant. It is, of course, a serious impediment in the development of team proficiency and espirit, both of which are essential to improve the generally unsatisfactory performance of the test sample.

MODULAR TRAINING FOR RESERVE COMPONENTS
TRANSFERRED TO TEA '79

M60A1 WSTEA

a. Test status. Initial analysis of data completed as of 30 June 1976 has been made. Additional data reduction is required to complete correl tion of relationships between training and combat effectiveness for representative samples of CONUS AND USAREUR M60A1 tank crews.

b. Responsible agencies. The tests were initiated and sponsored by Director, Army Training Study (ARTS), and Commander, US Army Armor Center, Fort Knox, KY, and completed by the US Army TRADOC Systems Analysis Activity (TRASANA), White Sands Missile Range, NM.

c. Synopsis of test.

1. Objectives. The primary objective of the test was to determine the relationship between training and combat effectiveness for CONUS and USAREUR tank crews. Secondary objectives included determining the relationship between institutional and unit training programs and determining the relationships between personal history prior training and the probability of main gun hit (Ph) by crews during tank Table VIII firing.

2. Test design. The measure of performance used in this analysis was the number of main gun hits per rounds fired on Table VIII. The firing crewmen were administered the TRANSANA-designed M60A1 WSTEA Tank Crew Personnel Survey to determine their personal history and training background. The Ph and survey data were analyzed to identify relationships among the data sources. Because the physical characteristics and conduct of USAREUR and CONUS tank tables differ, data and conclusions are reported separately.

d. Description of subtests-none.

3. Tests were conducted at the 7th Army Training Center, Grafenwohr, Germany and on a CONUS divisional post. Each location constitutes a separate subtest and results from one cannot be correlated with the other. To measure combat effectiveness (the prime objective), as related to training proficiency, the Ph data derived from Table VIII engagements were input to the Tank Exchange Model (TXM). The scenario consisted of gaming M60A1 tanks against T-72 tanks supported by BRDM with SAGGER missiles. The standard quasi-combat Ph (Army Material System Analysis Agency (AMSAA) curves) for both forces was used as the base case. Analysis was made by quantifying the effect of actual CONUS and USAREUR Ph on the red/blue kill ratio. The results of the war gaming are classified confidential and are available in Chapters 2 and 4, Appendix C, CONUS/USAREUR Hit Data of TRANSANA Technical Report 4-78.

e. Sample size.

(1) Sample size: Data was gathered from January to June 1978 on a total of 356 M60A1 tank crews consisting of 1288 individual tank crewmen (662 CONUS, 626 USAREUR). This sample was drawn from a total of four CONUS and six USAREUR tank ballations. This sample ws drawn from a total of four CONUS and six USAREUR tank battalions.

f. Summary of results, findings, and conclusions.

(1) Summary of findings. The following significant findings were reported by TRANSANA:

(a) CONUS M60A1 tank crews did not perform at the quasi-combat Ph level. (QL3)

(b) The Ph for USAREUR crews was higher than that of CONUS crews when both engaged with battlefield gunnery (battle sights) techniques. (QL3)

(c) The Ph for USAREUR crews was higher than the quasi-combat Ph values only at the 1100-1300 meter range band. (QL3)

(d) The M60A1 crew combat effectiveness was, for CONUS in particular, 40 to 50 percent less than the baseline (quasi-combat Ph values) effectiveness. (QL3)

(e) Seventeen (17) and twenty-one (21) percent of the tank commanders in USAREUR and CONUS, respectively, did not know where to aim on a target when engaging with battlesights. (QL3)

(f) Twenty-one (21) and twenty-eight (28) percent of the gunners in USAREUR and CONUS, respectively, did not know where to aim when engaging a target with battlesights. (QL3)

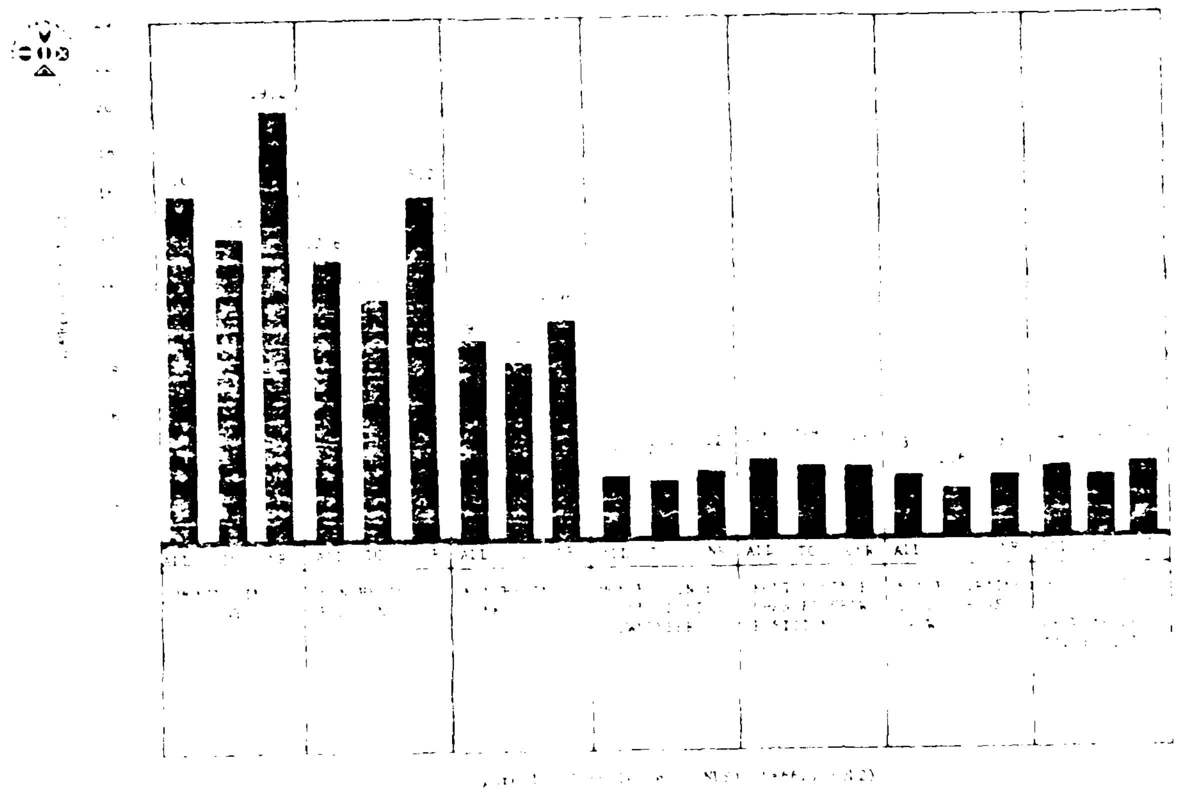
(g) The strongest influence on hit performance was past proven ability and experience on Table VIII. (QL1)

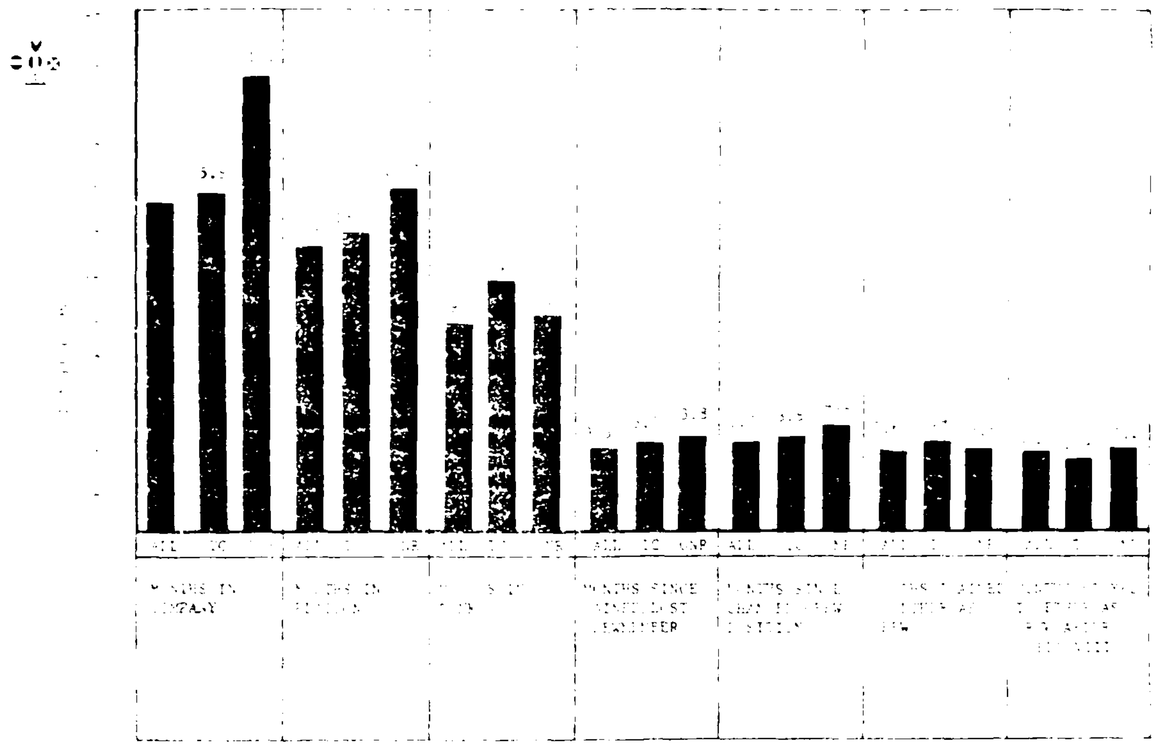
g. Significant Army Training Study Findings: Analysis of the technical report data base and participant soldier comments reveals the following:

2. Turbulence/turnover: (QL2)

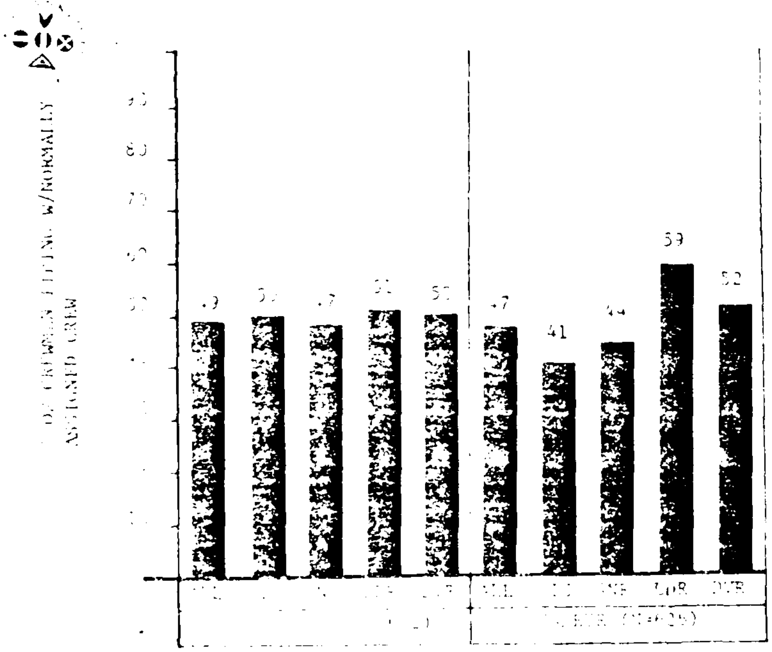
(a) The average number of months a crewman has been assigned to a tank company was 15.3 months in USAREUR and 16 months in CONUS. However, the mean time the crew had trained together was 3.6 months in USAREUR and 3 months in CONUS. Further, the data showed the mean crew position change

to be 3.7 and 3.6 months respectively. While the standard deviation was large (10 and 6 months respectively) for these data, it was evident that a significant amount of turbulence within crews/platoons was being internally generated within the unit. This conclusion was reinforced by data showing that 50.6% of the crewmen did not fire Table VIII with their assigned crew. Since over 50% of all crews rate training together as important (Table D-2, page D-17) it is reasonable to assume that this turbulence impacted negatively on Ph. These rates of turbulence are compatible with data from the Tank Crew Turbulence Test. Figures 1-3 portray this data.





ALL
MONTHS IN COMPANY
MONTHS SINCE
MONTHS SINCE



90
80
70
60
50
49
47
51
50
47
41
44
59
52
ALL
LDR
DVR
% CREWMEN FIRING W/NORMALLY ASSIGNED CREW

(b) The data show significant loss of whole crew training due either to crewmen not being assigned to a tank or being absent from training.

CONUS	NO ONE ASSIGNED	NEVER	SELDOM	HALF THE TIME	USUALLY	ALWAYS
Driver	10%	2%	3%	5%	19%	60%
Loader	26%	6%	8%	7%	18%	15%
Gunner	7%	4%	6%	8%	21%	54%
Tank Commander	1%	2%	4%	3%	14%	76%
USAREUR						
Driver	5%	1%	2%	5%	15%	73%
Loader	19%	4%	4%	6%	16%	52%
Gunner	5%	3%	2%	5%	17%	68%
Tank Commander	2%	3%	2%	3%	11%	80%

Table 1. Percent of Crew Available for Training

3. Soldier attitudes. When asked the question, In what areas do you feel your tank crew needs the most training?, 68% of the 1288 crew members responded. Comments were largely negative with many stressing the need to keep crews together longer, fire more often and to eliminate other activities which result in crewmen not being present for training. Further, a need for additional repair parts and enhanced maintenance capability was expressed. The tone of these comments indicate that poor training, resulting from poor management, impacts adversely on motivation and morale. In turn, this impacts on a unit's ability to train to proficiency. (QL4)

4. Training readiness. The standard used by ARTS to evaluate tank gunnery proficiency is Ph essentially equal to the AMSAA curve to be combat ready[1]. Mimimum acceptable standards for the tested units (all forward deployed or early deploying units) should be 95% of the AMSAA curve, 95% of the time. As indicated by the TXM output, proficiency achieved was 40% to 50% below the standard. (QL4)

5. A major finding of this study was that those crews who had previously fired well continued to do so, and those that did not, continued to fail. This finding gives rise to a conclusion that the evaluation feedback mechanism necessary to design and implement corrective training associated with tank Table VIII is not wholly effective. (QL4)

[1] AMSAA curves describe the design capability of the weapons system as a function of probability of hit (Ph) at various ranges under simulated operating conditions.

6. Frequency to proficiency: As stated, commanders in the Battalion Training Survey expressed judgments that tank gunnery training should be conducted quarterly. This is supported by the findings that large numbers of tank commanders and gunners in CONUS and USAREUR did not know proper placement of sight reticles during battlefield gunnery engagements, and that a Ph of less than 0.1 was attained by CONUS crews in precision engagements. (QL4)

7. Training distractors. The numerous crewmen complaints as to the adverse impact of outside influence on their ability to train to proficiency are reflected in the not present for training statistics on Table 1. While the data does not discriminate as to the nature of these distractors, it is assumed that across the sample of ten battalions these distractors are related to guard, housekeeping, and support requirements as well as to mandatory training subjects not directly related to tank crew proficiency. Seventy percent (70%) of CONUS crews (438 crewmen) nd sixty percent (60%) of USAREUR crews (358 crewmen) stated that a "big improvement" on Table VIII scores would result if they could train more as a full crew. (QL4)

8. The combination of turbulence and personnel not present for training has been identified by commanders in the Battalion Training Survey (BTS) as resulting in a requirement for additional frequency of training and additional training time to maintain 95% proficiency. Further, these commanders have identified a need to fire tank gunnery quarterly. The results of this test support these judgments. Since it cannot be concluded that these are the only causative factors, a need for additional investigation is indicated. (QL4)

Data on knowledge and general information and actual Ph, particularly of CONUS crews, substantiate that crewmen do not demonstrate the requisite gunnery skills. Further, the already deficient USAREUR Ph levels deteriorated during platoon firing on Table IX (see classified annex, Table 3, Probability of Hit, Table VIII versus Table IX). While further reseach is necessary to focus precisely on cause and effect, for the present it seems prudent to accept crew judgments and take action to reduce training distractors and turbulence. This insight is wholly consistent with the Battalion Training Survey judgments emphasizing training at the crew/platoon level, and the personnel conditions which require both more frequent and longer periods of gunnery training. Table 2 depicts a comparison of the mean probability of hit (Ph) of tank crews by rank of the tank commander. Comparisons between CONUS and USAREUR cannot be made due to differences in scoring procedures and range facilities. The most distant target engaged by USAREUR crews was placed at 1425 meters. Thus, USAREUR Ph is valid for battlesights engagements only. By contrast CONUS crews were required to engage targets out to

ranges of 2150 meters. The use of Tank Gunnery Assistance Teams (TGAT) in CONUS served to impose a standard for hit determination which was common across the sample in contrast to USAREUR where hit determination procedures and standards varied by unit.

CONUS						USAREUR					
OFF	Ph	N	NCO	Ph	N	OFF	Ph	N	NCO	Ph	N
01/02	.375	42	E4	.45	1	01/2	.595	29	E5	.652	19
03 Above	.426	12	E5	.376	46	03 Above	.614	12	E6	.606	73
			E6	.352	60				E7	.685	25
			E7	.363	33				E8/9	.396	2
			E8/9	.6	3						
NON-[illegible] AVERAGES	.4	54		.429	142		.605	41		.585	119

TOTALS: Ph = .[illegible] Ph = .595

N = 196 N = 160

Table 2. Comparison of Probability of Hit (Ph) by Tank Commander Category (Officer vs NCO) (QL4)

SCALE RANGE SUB-CALIBER TESTS

TRANSFERRED TO TEA '79

Training Time Ratio Survey

a. Test status as of 22 July 1978. Report of the survey data reduction has been completed by Actuarial Research Corporation and has been forwarded with a narrative report to the Commander, USAARMC, Fort Knox, KY. The ARTS, SWT, USAARMC has completed its survey report and has provided it to the Director, ARTS Army Training Study.

Selected data has been withdrawn from the Training Time Ratio Survey to be used as input to the BTM to support sensitivity analysis into the effects of varying institutional training programs on unit training programs.

b. Responsible agencies. The test plan and survey was developed jointly by ARTS; the ARTS SWT, Fort Knox, KY; and Actuarial Research Corporation of Arlington, VA. The survey was conducted by the ARTS SWT under the sponsorship of the Commander, USAARMC, Fort Knox, KY.

c. Synopsis of test. The purpose of the study was to provide data relative to the impact on unit training programs that would result from varying the length of the Basic Armor Training (BAT) course. The primary objective of the effort was to acquire sufficient data to permit the Armor School and ARTS to determine:

1. The ratio of unit individual to collective training as a function of varying individual training time in the training base thru input to the BTM.

2. Individual levels of Armor crewman proficiency resulting from varying the lengths of training periods (12, 14, 15 week variations of BAT), and

3. The impact on unit readiness responsibilities as a result of varying the lengths of training periods in the institution.

Individual proficiency is expressed as a percentage of Skill Level 1 Armor crewmen SM tasks trained to mastery. Examination of BAT resulted in an estimation that MOS 19E/F trainees could be trained to the requisite levels of proficiency for Armor crewmen critical tasks over time, as indicated:

12 weeks = 70 percent

14 weeks = 85 percent (most closely represents current course)

15 weeks = 95 percent

For any given variation of the number of weeks in the training base it was assumed that the resultant proficiency of the graduates would have some proportionate effect on a unit's training program and readiness.

The lack of meaningful empirical data needed to satisfy the objectives of the study was acknowledged. Also it was recognized that much of the desired information was of the type that could be derived only from the qualitative judgments of experienced military personnel. For these reasons, the medium of a survey was selected as the data collection instrument. This survey was specifically designed to be compatible with the BTS so as to ensure interface with the BTM.

This survey uses a unique methodology, Magnitude-Estimation Scaling (MAG-ES), to measure the relative criticality of training Soldier's Manual tasks for two separate MOS. The survey was accompained with a guide book listing 131 SM tasks for these MOS, 19E (Gunner/Loader, and 19F (driver) MOS.

MAG-ES provides a weighted, quantified, prioritization of the issues that reflect the collective perceptions or value judgments of experienced military personnel with respect to subjective issues such as "criticality" of training. The weighted priorities provide the decision maker with guidance for adjusting training programs in accordance with changes in available resources.

Each of the respondents was asked to complete an anonymous questionnaire relative to pertinent biographical information. The purpose of this information is to establish the credentials of the respondent and ascertain whether he has sufficient background to participate in the survey.

d. Description of subtests: None.

e. Sample size.

1. Sample size. A total of 63 officers and NCOs from four CONUS Armor Battalions participated. The sample was broken down by position as follows:

POSITION	SAMPLE
BN CMDR	- 2
BN XO	- 1
BN S3	- 4
Company Cmdr	-10
CSM	- 1
Plt Leader	-20
Plt Sergeant	-28
SQD Leader	1

2. Reliance on the training time survey data and the resultant findings must take into consideration the following relative to the sample:

(a) Sample size--the average sample for most questions was 51 to 53 responses (out of a total of 63 respondents). This sample decreased even further when collective training as opposed to individual training was the subject for questions.

(b) Experience--since the responses were to be "best professional estimates," the experience factor of the interviewees was not ideal. Of the 23 E6/E7 NCOs, 17 (73 percent) had less than six years armor experience (52 percent had less than two years). Of the 34 junior officers, 28 (82 percent) had less than six years experience (64 percent had less than two years; one 2LT had been on active duty two months).

(c) Organization--all personnel interviewed were from one division's four armor battalions, which possibly induced bias of some order into the responses.

(d) Because of these limitations, survey data provide limited insights only based on mathematical extrapolations. Therefore, all data should be considered as rates at ARTS Quality Level (QL) 4.

f. Summary of results, findings and conclusions.

1. Summary of results. (QL4)

The results of six of the seven-part survey are reported in four topical categories. The results of Set 7, "Training Survey," are being used separately by the Armor School.

The four categories consist of the following:

(a) SM task ratings. - the separate weighted prioritization of Soldier's Manual task generic groupings for 19E and 19F MOS by Magnitude-Estimation Scaling: Set I.

(b) Training of unit replacements - the measurement of the impact of unit training of replacements who are BAT graduates of courses varying in length from 12 to 15 weeks; (Set II) corresponding to 70, 85 and 95 percent proficiency in SM SL1 Tasks.

(c) Times and frequencies. - Estimates of the number of hours and the number of repetitions per year to train specific Soldier's Manual Tasks for the 19E and 19F MOS, collective tasks, and ARTEP missions (Sets III, V, & VI).

(d) Training strategies. - selection of alternative approaches for unit training of soldiers with varying degrees of background or experience in the subject matter.

Each topic is discussed separately.

(a) SM task ratings

Using the Magnitude-Estimation Scaling (MAG-ES) metholology, the respondents were asked to rate the relative criticality of training for the 19 functional SM task groups. The context for comparing the items was that training must be accomplished to enable the Army "to fight any place at any time."

Tables 1 and 2 summarize the ratings in the form of weighted prioritizations of the 19 Soldier's Manual Tasks for the 19E and 19F MOS respectively. The tasks are presented in descending order of criticality. The relative weights are displayed graphically in Figures 1 and 2.

Rank Order	19E Soldier's Manual Tasks	Relative Weight
1	Tank & Crew Weapons Employment	5.2
2	Gunnery Preparations	5.1
3	Turret Maintenance Procedures	4.0
4	Combat Skills	3.8
5	Crew Served Weapons Maintenance	3.5
6	Map Reading	2.7
7	Individual Weapons Maintenance & Employment	2.4
8	General Maintenance Procedures	2.3
9	Driver Tactical Operating Procedures	2.2
10	Hull Maintenance Procedures	2.1
11	Individual NBC Procedures	2.0
12	Driver Mechanical Operating Procedures	1.8
13	Communications Equipment Operations & Maintenance	1.7
14	Collective NBC Procedures	1.6
15	Tank Recovery Procedures	1.5
16	Intelligence and Security Procedures	1.4
17	Communications Message Handling Procedures	1.2
18	First Aid	1.2
19	Land Mine Warefare Procedures	1.0

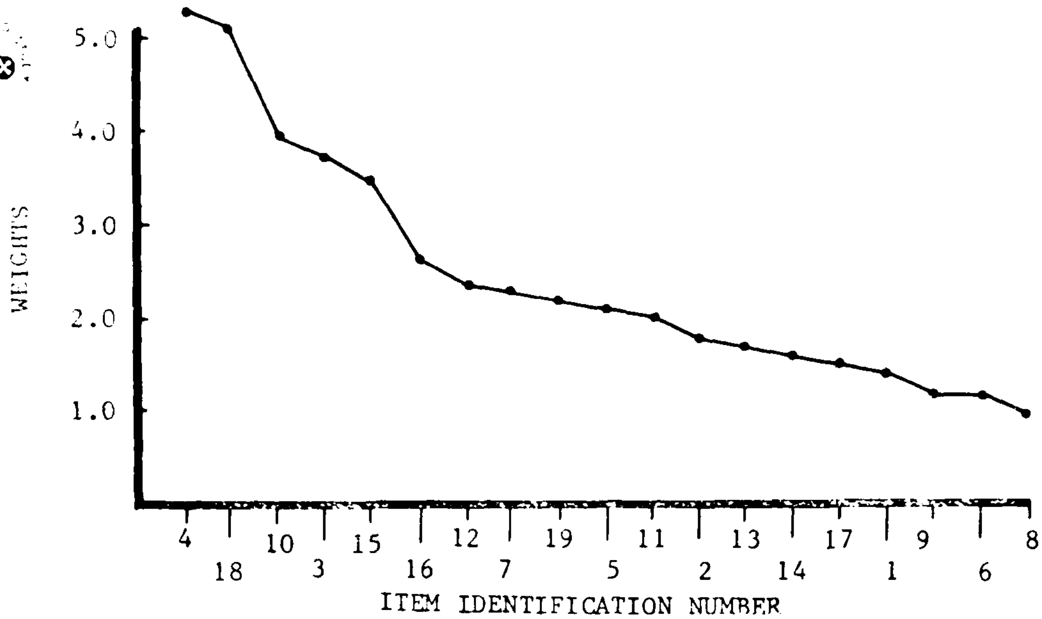
TABLE 1
RELATIVE CRITICALITY OF SOLDIER'S MANUAL TASKS
19E (Gunner/Loader)
n = 63

Rank Order	19F Soldier's Manual Tasks	Relative Weight
1	Driver Tactical Operating Procedures	5.1
2	Driver Mechanical Operating Procedures	4.2
3	General Maintenance Procedures	4.1
4	Hull Maintenance Procedures	3.9
5	Combat Skills	3.2
6	Tank Recovery Procedures	3.2
7	Tank and Crew Weapons Employment	2.7
8	Map Reading	2.5
9	Gunnery Preparations	2.4
10	Crew Served Weapons Maintenance	1.9
11	Individual NBC Procedures	1.7
12	Individual Weapons Maintenance and Employment	1.6
13	Collective NBC Procedures	1.6
14	Turret Maintenance Procedures	1.5
15	Land Mine Warfare Procedures	1.3
16	Communications Equipment Operations Maintenance	1.3
17	Communications Messagee Handling Procedures	1.1
18	Intelligence and Security Procedures	1.1
19	First Aid	1.0

TABLE 2
RELATIVE CRITICALLITY OF SOLDIER'S MANUAL TASKS*
19F (Driver)
n = 63

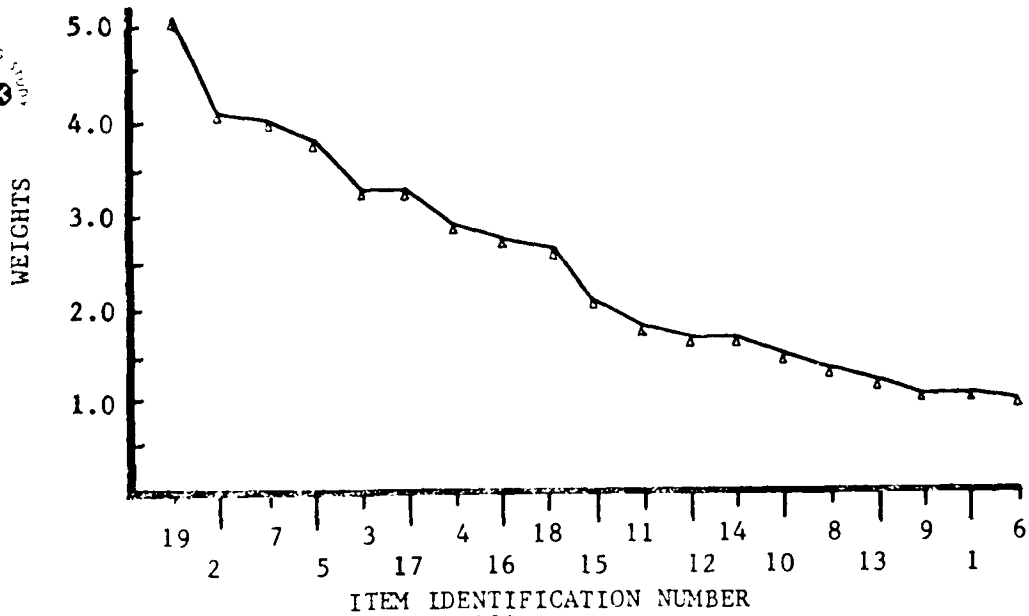
CAUTION

The weights for each MOS cannot be compared directly, e.g., a rating of 1.0 for 19E is not identical to 1.0 for 19F. Hence, the weights are not to be compared except where specifically stated.



N = 63

Figure 1. Relative Criticality of Soldier's Manual Tasks 19E (Gunner/Loader) (QL4)



N = 63

Figure 2. Relative Criticality of Soldier's Manual Tasks 19F (Driver) (QL4)

With respect to the 19E MOS, respondents collectively rated Task No. 4, Tank and Crew Weapons Employment, as the most critical training issue with a relative weight of 5.2. The weight can be interpreted as being 5.2 times more critical than the lowest rated item, i.e., Task No. 8, Land Mine Warfare Procedures, with a weight of 1.0. Conversely, the lowest item can be considered to be 19 percent as critical as the highest.

Because MAG-ES establishes ratios among each of the tasks, the same logic applies between any two items, e.g., Task 10 (wt. 4.0) is two times more critical than Task 11 (wt. 2.0); Tasks 9 and 6 with identical weights are 50% as critical as Task 12.

There is no limitation on the number of items that may be judged by the respondents as being of equal criticality.

As might be expected gunner/loader operational activities received the greatest emphasis. Maintenance procedures also rate relatively high.

Since the weights are additive it is possible to group all operational tasks and all maintenance tasks separately and compare the weights. Any imbalance in the number of items, e.g., 3 operational and 5 maintenance, may be nullified by dividing the sum of the weights by the number to derive an "average criticality" factor. The factors may then be readily compared.

The 19F ratings clearly show the stress on the operational and maintenance aspects of the driver with Item No. 19 (wt. 5.1) being the highest and Item No. 6 (wt. 1.0) the lowest. These ratings appear to be in keeping with the requirements of the MOS.

Since the Soldier's Manual Tasks are identical for both MOS, a comparison was made of the 19E and 19F ratings as shown in Figure 3. Note that a scale change from weights to percentage weights was necessary to affect the comparison.

The comparison in Figure 3 clearly demonstrates the difference in flows between the two MOS. Those items for which very little difference is noticed are for the most part general tasks.

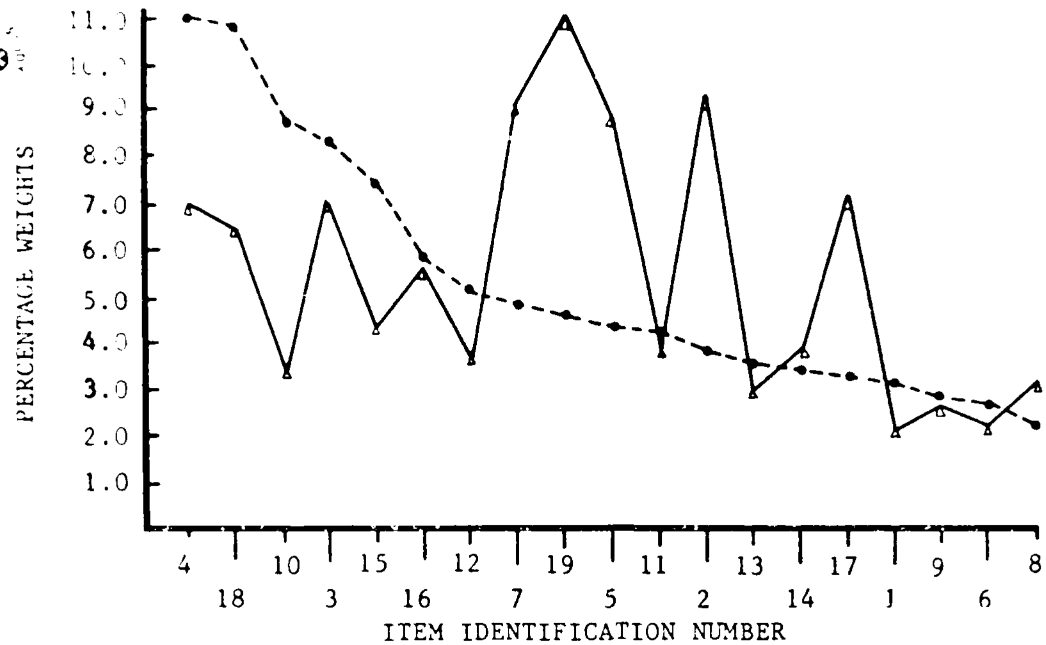


Figure 3. Comparison of Ratings for Soldier's Manual Tasks 19E versus 19F (QL4)

The weights provide the training planner with unusual guidance for designing programs that meet the needs of the respective MOS. It is now possible to stress the more critical tasks providing that training in the less critical are not totally forgotten or unduly jeopardized. The capability for adjusting schedules more precisely in the event of imposed resource constraints is provided.

The reader is cautioned, however, not to equate priorities with cost of training. A very critical task may be relatively inexpensive to train, whereas a very low rated item may be very costly. A knowledge of unit training costs in conjunction with the weights is essential in conducting the trade-offs.

(b) Training of unit replacements.

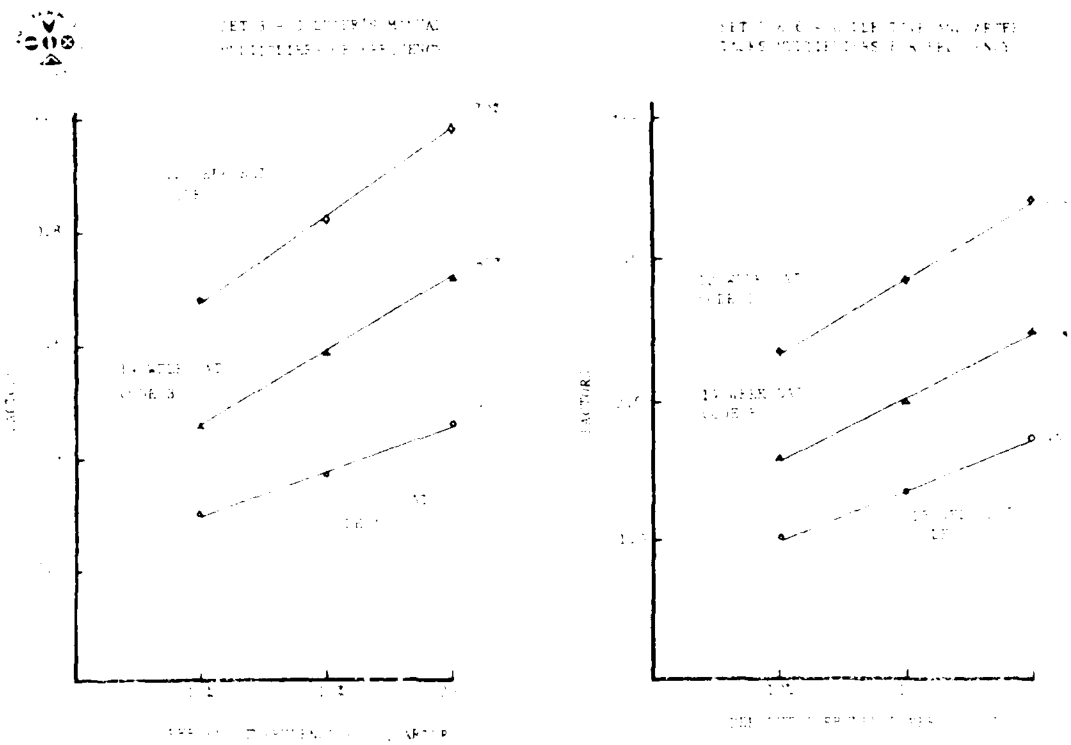
This portion of the survey attempted to measure the impact on unit training that would be incurred by the inflow of Basic Armor Training (BAT) graduates. Two variables are associated with the BAT replacements:

a. The length of their BAT course, i.e., 12, 14, or 15 week courses, factors that for the purpose of this study are associated with proficiency levels of 70, 85, and 95 percent respectively; and

b. The rate of replacement input, parametrically assumed to be 10, 15, and 20 percent per quarter.

The respondents were asked to estimate the additional amount of time that would be required to train replacements with less BAT background and at increasing influx rates. These estimates were then converted to general first-order multiplication factors that could be used to adjust training schedule frequencies in accordance with the entry conditions.

Figure 4 depicts the adjustment curves for the three types of BAT training courses, i.e., a 12, 14, or 15 week course. Note that the slope of the straight line approximations increases as the length of the course decreases. In other words the incremental increase in training requirements rises as the preparation of the replacement decreases. This condition obviously creates a greater burden on the unit, especially as the replacement rate increases.



The adjustment factor scale is valid only if the base condition, i.e., the set of unit personnel conditions for which the frequency of training is based, happens to be 10 percent replacement rate of 15 week BAT graduates. If the frequencies, however, are based on another set of conditions, e.g., 15 percent replacement rate of 14 week graduates, the scale must be changed. In the latter case, all data points would be normalized or divided by 2.0. The 1.0 would become 0.5 and the 3.0, 1.5. Any base condition within the range of empirical data shown may be used as the new normalization point.

(c) Times and Frequencies

The respondents were asked to estimate the number of hours per period and the number of periods per year that would be required for training the 19E and 19F Soldier's Manual Tasks (Set III of the Questionnaire) collective tasks, (Set V) and ARTEP missions (Set VI). Base conditions representative of unit personnel training detractors, e.g., turbulence, were specified for each group.

Initial tabulations revealed a generally wide range of responses for any given subject. Some of the responses were obviously excessive and beyond the realm of practicality. To reduce the effects of the extreme responses, and hence, possible severe distortions in the data, an adjustment technique was employed.

All responses beyond the arithmetic mean plus one standard deviation were eliminated and new means computed. The disadvantage of this approach is the loss of some responses from the data base. In view of the improved stability of the data, however, the overall impact was believed to be minimal.

The data for all three subjects has been summarized in tabular form and adjustment factors applied for the full range of BAT replacement conditions set forth in Set II, i.e., 12, 14, and 15 week BAT graduate replacements at rates of 10, 15, and 20 percent -- 9 cases overall. Products of time and frequency as well as confidence levels are given also.

With respect to collective task and ARTEP mission estimates, values are given for squad, platoon, company, and battalion level.

(d) Training Strategies.

The training status of an individual in a unit probably can be classified according to one of the following with respect to any particular subject matter:

° Fully trained and experienced - Code I

° Trained but inexperienced - Code II

° Trained but requires supervision (high decay) - Code III

° Untrained in the subject matter - Code IV

At any one time the unit may have any combination of the above represented. In order to accomplish effective, meaningful training, the trainer must somehow accommodate to the situation.

Six alternative approaches were postulated by the Armor School and presented to the respondents for their consideration.

The training approaches are:

1. Two separate periods of formal training -- one for initial training and one for retraining.

2. One formal period oriented to those who need retraining with self-paced/off duty instuctions for the initial learners.

3. One formal period oriented to those who need initial training -- with those who do not need retraining being released for other activity early.

4. One formal period oriented toward those who need initial training -- all members attend and participate in the entire training period.

5. Two formal training periods: Period One oriented to and attended by initial learners only. Period Two oriented toward all members and attended by the entire unit.

6. No change from current training policy.

The seventh category, "Other", solicited suggestions and remarks. (The latter are being summarized for use by the Armor School.) Given seven combinations of training status classifications, the respondents were asked to select the approach or strategy they believed would best accomplish the objective for unit training of Soldier's Manual Tasks.

Three aspects of training were posed. 19E - Gunnery subjects, 19F - Driver subjects, and General subjects.

Tables 5, 6, and 7, summarize by frequency of response the most desirable strategy for any one grouping of individuals.

The approach with the greatest percentage of responses may be assumed to be the most desirable although for Groups I & IV, two approaches, 3, and 5, and Groups III & IV, two approaches, 1, and 4, were consistently rated at almost equal frequencies.

Training	Training Status Classification Group Codes						
Approach	I & II	I & III	I & IV	I, II & IV	II & III	II & IV	III & IV
1.	5.5	7.3	12.1	13.8	20.0	23.2	33.9
2.	30.9	18.2	5.2	6.9	9.1	8.9	5.4
3	36.4	27.3	32.8	12.1	14.5	7.1	1.8
4	12.7	14.5	8.6	22.4	34.5	21.4	32.1
5.	5.5	23.6	36.2	41.4	16.4	33.9	21.4
6.	3.6	1.8	1.7	—	—	—	—
7.	5.5	7.3	3.4	3.4	5.5	5.4	5.4
n	55	55	58	55	55	56	56

TABLE 5. TRAINING STRATEGIES FOR GUNNERY SUBJECTS (19E)

Training Approach	Training Status Classification Group Codes						
	I & II	I & III	I & IV	I, II & IV	II & III	II & IV	III & IV
1.	7.0	5.3	10.3	8.6	20.8	10.5	31.6
2.	22.8	14.0	5.2	6.9	11.3	12.3	5.3
3	31.6	40.4	34.5	25.9	18.9	14.0	8.8
4	19.3	12.3	10.3	17.2	28.3	19.3	29.8
5.	8.8	21.1	37.9	39.7	17.0	42.1	22.8
6.	7.0	1.8	—	—	—	--	—
7.	3.5	5.3	1.7	1.7	3.8	1.8	1.8
n	57	57	58	58	53	57	57

TABLE 6. TRAINING STRATEGIES for DRIVER SUBJECTS (19F)

A-6-13

Training Approach	Training Status Classification Group Codes						
	I & II	I & III	I & IV	I, II & IV	II & III	II & IV	III & IV
1.	3.6	7.3	15.3	10.5	14.3	20.7	27.6
2.	29.1	16.4	11.9	7.0	17.9	6.9	3.4
3	34.5	32.7	28.8	26.3	19.6	10.3	1[illegible].3
4	14.5	16.4	11.9	22.8	28.6	22.4	37.9
5.	5.5	20.0	27.1	28.1	12.5	34.5	17.2
6.	5.5	3.6	1.7	1.8	3.6	1.7	1.7
7.	7.3	3.6	3.4	3.5	3.6	3.4	1.7
n	55	55	59	57	56	58	58

TABLE 7. TRAINING STRATEGIES for GENERAL SUBJECTS

2. Significant Army Training Study Findngs. Analysis of the data reveals the following: (QL4)

(a) Results of the training Time Ratio survey are compatible with results of the Battalion Training Survey (BTS).

(b) Limitations imposed by sample size and survey techniques limit usefulness of the data to no more than insights as to the effects of changing training base capabilities of unit training programs. However, as a technique this should be considered a significant advance in data collection methodology.

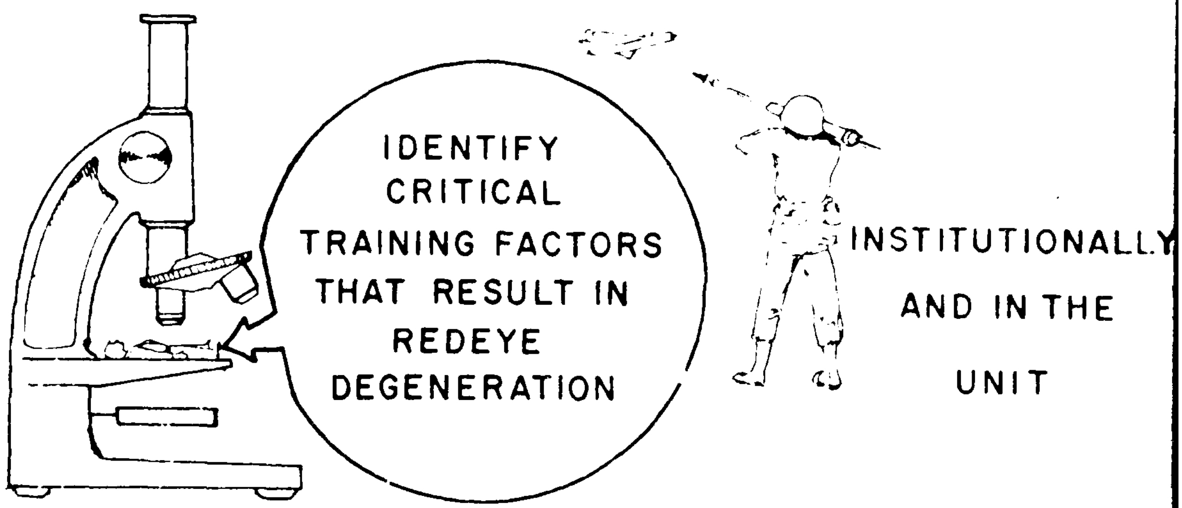
(c) Survey respondents were asked to determine the length of instructional periods and frequency required without consideration of available training days and without placing their answers into the context of a comprehensive program. This is the reason that "required" hours often total more than available training hours. The integration of these "required" hours with available hours is done by the BTM in a pre-processing module. The integrated (reduced) program is then included in the Battalion Annual Training program. Due to time constraints and computer capacity limitations, a sensitivity analysis will not be complete with the basic ARTS report. Upon completion, the results will more accurately define the efforts of a reduction (or increase) in the quality of BAT graduates on unit training costs, programs, and proficiency.

In the interim, this data can be used to gauge the the relative magnitude of importance placed on quality of BAT graduates on various aspects of unit training. To consider this data in formulation of training policies is, at this time, attaching unwarranted significance to the study's restricted sample size. However, by administering the survey to an expanded sample, more representative of the user population during the ARTS II period, valuable data can be collected in support of the development of the BTM. To more precisely focus on the quality of BAT graduates as a function of training time in the institution, the Armor Center should include testing course length variations during the follow-on proficiency and retention studies recommended in TEA '79.

XM-1 OPERATIONAL TEST II

TRANSFERRED TO TEA '79

OBJECTIVE:



a. Status of test. Initial analysis of data completed as of 6 July 1978. Additional data reduction and analysis to be accomplished to complete correlation of Reserve Component Redeye training and employment of the Redeye Launch Simulator (RELS) following completion of testing on 30 July 1978.

b. Responsible agencies. The tests were initiated and sponsored by Director, Army Training Study (ARTS), Fort Belvoir, VA, and Commander, US Army Air Defense Center and School (USAADCS), with assistance from the US Army TRADOC Systems Analysis Activity (TRASANA), White Sands Missile Range, NM.

c. Synopsis of test.

1. Objective. The primary objective of this test was to identify the critical training factors in Man-Portable Air Defense Systems (MANPADS) which result in degradation of the systems. Training in both the institution and the unit is addressed.

2. Test design. The measure of performance used in the test included probability of hit (Ph) as scored by the tracking head trainer or range officer. Data addressing proper use of range ring profile and attitudinal data concerning the value of the Redeye launch simulator (RELS) and/or Redeye live firing results were collected in this test.

In addition, comparisons were made of the number of aircraft destroyed as a function of gunner proficiency using selected war models. The Redeye crewmen were given a written test which measured their knowledge of the use of the range ring profile and were then graded on five aircraft engagement simulations in the moving target simulator (MTS). Demographic and attitudinal data were also collected from all gunners.

d. Description of subtests. Unit tests were conducted in Active and Reserve Component, FORSCOM, USAREUR, and 8th Army units. Also tested were selected US Marine students at Fort Bliss, TX. Data needed to develop cost factors for training devices, to allow for analysis of training programs and to evaluate soldier's manual/ARTEP tasks were also collected. Existing air defense war models were examined for adequacy with regard to support of training evaluations. Simulator training was examined to determine proficiency increases and retention and decay curves which could optimize simulator use. Personnel instability was examined to determine its effect on proficiency, morale, and soldier attitudes. The level of proficiency on Redeye atained by lower mental category personnel was also examined. Finally, Reserve Component training in both the institution and unit was examined to determine possible alternative training programs. Additional investigations addressed interoperability factors through the use of Redeye by the German Air Defense Forces, and the value of the RELS versus live Redeye firing.

e. Sample size. Redeye test effort sample size.

1. Redeye WSTEA 491 gunners.

2. Redeye ARTS 1518 gunners.

f. Summary of results, findings, and conclusions.

1. Summary of results by test agency. Conclusions on resources to training programs.

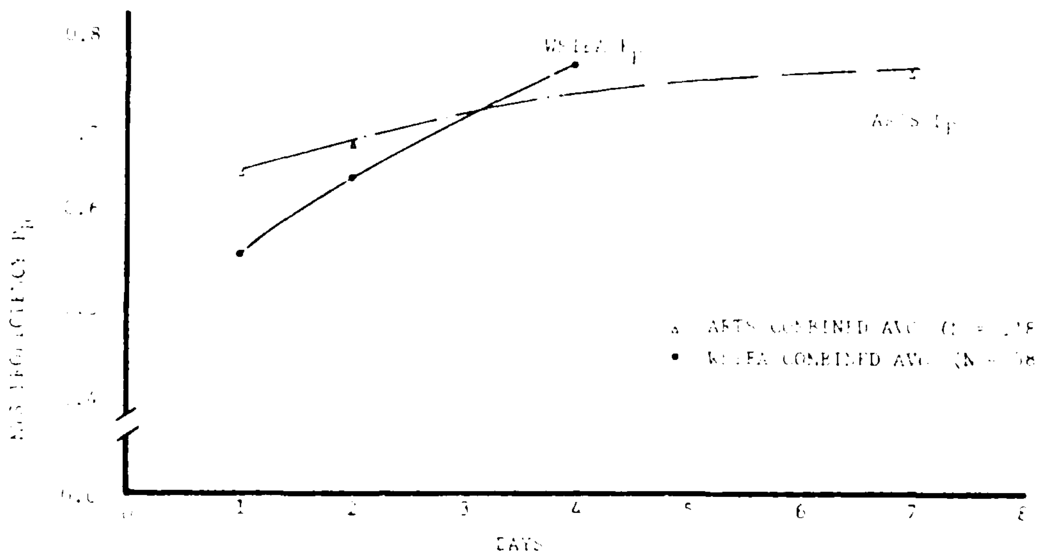
(a) Current resources for Redeye training are required if proficiency is to be maintained. (QL3)

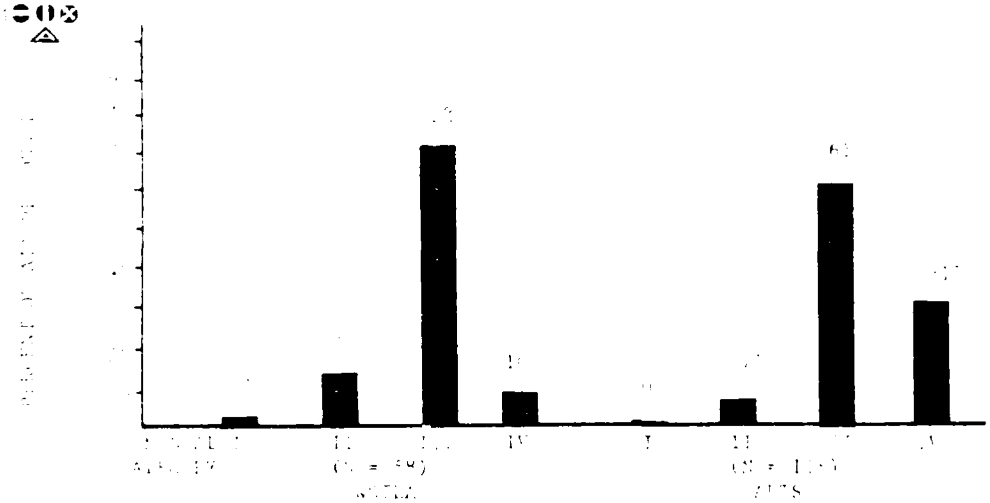
(b) Additional moving target simulators (MTS) and tracking head trainers (THT) are required to provide increased "hands-on" training capability for lower mental category personnel, who, as has been shown, required more frequent refresher training to maintain acceptable levels of proficiency. (QL3)

(c) The allocation of live rounds for annual service practice (ASP) should be one Redeye/section/year as recommended in the Redeye WSTEA. (QL3)

2. Conclusions on Training Programs to Proficiency:

(a) Three additional hours of MTS training, which were implemented following the WSTEA recommendations, resulted in a slight increase in proficiency during ARTS tests. Actual benefit, however, was not apparent because of the lower AFQT scores of the ARTS test subjects when compared to the WSTEA subjects. (QL3)





(b) The markedly lower range ring profile (RRP) proficiency for ARTS subjects was attributed to the lower AFQT scores. A direct relationship between RRP and AFQT score was demonstrated. (QL3)

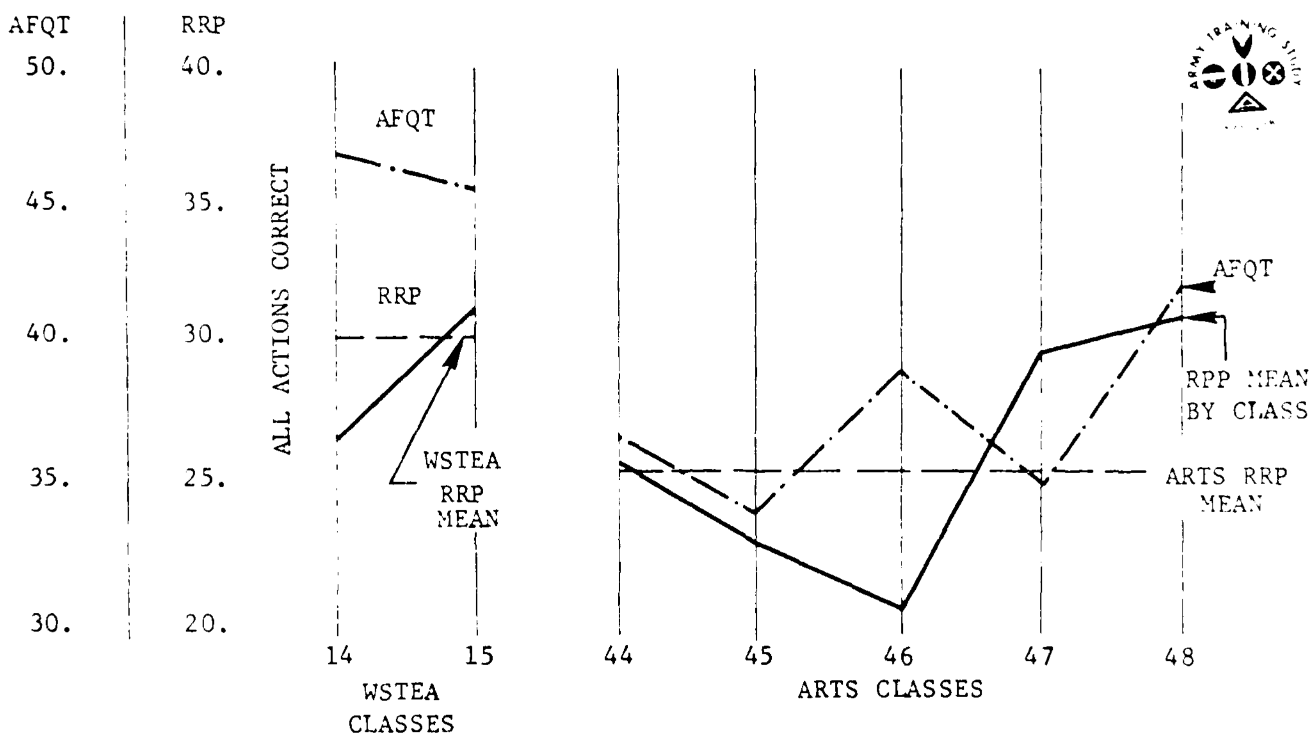


Figure 3. AFQT and RRP Proficiency Mean Scores for AIT Classes (QL2)

(c) Mental category IV gunners achieved an acceptable level of proficiency on the MTS. (QL3)

(d) Determination of range ring coverage is the most difficult task for all gunners of all categories. (QL3)

(e) The unit which fared the poorest during the WSTEA testing in both MTS and RRP training time as well as MTS Ph and RRP tests, increased Redeye training after the WSTEA with the result that scores increased during ARTS testing (Unit 1, Table 1). Conversely, the unit which faired best during the WSTEA apparently did not maintain the intensity of its training program with a resultant decrease in scores attained during ARTS testing (Unit 5, Table 1). (QL3)

[illegible]	[illegible]		[illegible] Ph		TNG TIME HRS		[illegible]	
	WSTEA	ARTS	WSTEA	ARTS	WSTEA	ARTS	WSTEA	ARTS
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.1	[illegible]	[illegible]	[illegible]
	-----	-----	-----	-----	----	-----	-----	-----
	[illegible]	[illegible]	[illegible]	[illegible]	4.5	3.14	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.9	1.9	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Δ [illegible]	[illegible]		[illegible]		[illegible]		[illegible]	

[illegible]

[illegible] Comparison of Proficiency of Units Tested for [illegible] ARTS versus Training Time (QL3)

(f) A direct relationship between RRP training and RRP proficiency followed the same trends in both the WSTEA and ARTS testing. (QL3)

3. Conclusions on Proficiency to War Models.

(a) War model simulations for Redeye should be improved by expanding the number of parameters used to define the engagement sequence. (QL4)

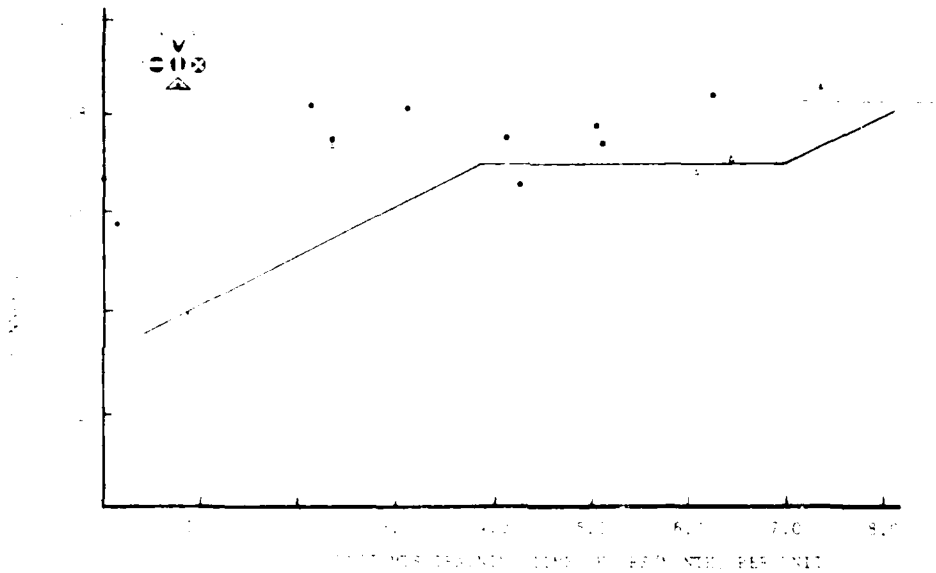
(b) Proficiency with Redeye involves more than the ability to complete the engagement sequence. The additional factors involving proper employment of Redeye should be reflected in war models. (QL4)

4. War Models to Combat Effectiveness. The results of the war model simulation indicated there is a direct relationship between the gunner's proficiency and the number of aircraft downed. (QL3)

5. Resources to Combat Effectiveness.

(a) Training within the MTS yields the greatest increase in gunner Ph and, therefore, should be maximized. (QL3)

(b) The frequency of MTS training in units is insufficient. In some cases, this appears to be due to lack of time. (QL3)



[illegible] MTS Training Time (QL3)

6. Training Effectiveness of Reserve Components. Additional study is required. Redeye density in RC is so low that training is very difficult to conduct. Analysis of results of this test indicates the following areas should be investigated in the future:

(a) Investigate the formation in each Readiness Region, of a Redeye battery which would be located near an available MTS. (QL4)

(b) Feasibility of one weekend/quarter of MTS tracking to maintain proficiency for Reserve Component Redeye personnel. (QL4)

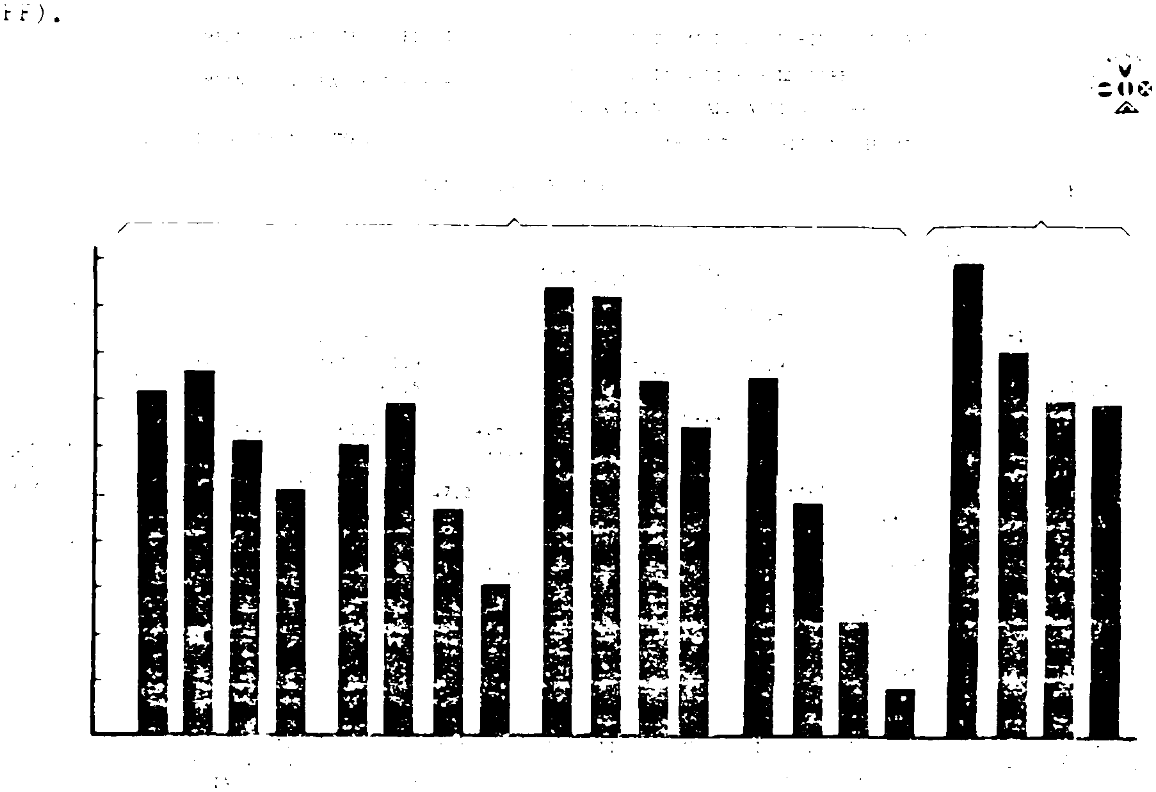
(c) Feasibility of maintaining one tracking head trainer (THT) kit per battalion. (QL4)

(c) Efficiency of using the "German Clothesline" target trainer for THT tracking practice in local Reserve Component centers. (U)

7. Implications of results for Stinger Training.

(a) The Stinger range ring profile, which is as complex as the original Redeye RRP, should be simplified. This simplification should be justified by computer simulations which show trade-offs between various profiles and Stinger effectiveness. (U)

(b) The Stinger system will require soldiers of higher mental category than the minimum currently acceptable for Redeye. This is demonstrated by the fact that mental category IIIb and IV personnel cannot presently judge range ring coverage for Redeye. It is reasonable, then, that they could not operate Stinger with its own complex RRP, infrared (IR) tone selection requirement, and identification friend or foe system (IFF). (U)



(c) The Stinger system requirement to detect, acquire, identify, and activate by the time the attacking aircraft reaches 1 o range ring coverage is unrealistic. The best gunners could not be trained to effectively accomplish this requirement. (U)

8. Conclusions of ARTS Redeye Study.

(a) The RELS training package is an effective training aid to reduce fear and build confidence. While it may be too late in the Redeye life cycle to acquire the RELS, the stinger launch simulator (STELS) would be effective as a training aid. (QL4)

(b) Less than one half of the Redeye gunners are satisfied with their work assignments and working conditions and over 50 percent of these gunners do not plan to reenlist. (QL1)

(c) Based on questionnaire responses, the turnover rate of Redeye gunners is approximately 30 percent per year. Based upon the number of gunners available for retesting in the units visited during the WSTEA, however, the actual instability in the Redeye sections was approximately 50 percent per year. (QL3)

(d) In addition to the availability of an MTS, the Reserve Components require additional THTs to provide greater availability to Redeye sections (current issue is approximately one THT per state National Guard organization). (QL3)

9. Additional research related to MOS 16P, Short Range Air Defense Missile crewmen, was conducted by Army Research Institute, concerning Chaparral Skill retention, as part of their 1978 work program. The research was performed to determine if Chaparral crewmen were able to demonstrate job proficiency upon arrival at their units, and if not to determine the causative factors.

(a) The test was conducted to evaluate the retention of Chaparral skills between training and utilization on the job, to determine the most effective schedule of refresher training, and to develop data on forgetting over time for task performed. The study involved training personnel in the unit to 100 percent criteria by use of job aids on six tasks. The air defense crewmen were then tested at 1, 2, and 4 month intervals to determine performance decay. Key features of the Chaparrel skill retention program included:

(1) Prepackaged evaluation tools.

(2) Prepackaged performance-oriented training materials.

(3) Training of squad leaders in performance-oriented evaluation.

(4) Training assistance visits by personnel qualified in performance-oriented training and in the Chaparral system.

(5) Orientation of battalion commanders.

(b) The sample size and summary of results were as follows:

(1) A total of 65 personnel completed the testing program.

(2) The following significant findings were reported by ARI:

a Performance on skills tested does not decay during the period from graduation until personnel report to the unit.

b Performance to standard on tasks which have job aids remains stable over at least a 4 month retention interval.

c Semi-annual refresher training may be sufficient for the six tasks tested.

(3) Significant Army Training Study findings:

a The results of this study provide significant support to the concept of job performance aids being developed.

b To be useful, job aids must be available at the equipment and their use must be enforced.

10. Summary of ARTS conclusions. Analysis of the report data base and participant soldier comments reveals information in the following areas:

(a) Instability. Instability with Redeye sections is presently about 50 percent per year in long tour areas and 100 percent per year in short tour areas. This instability has a significant effect as new personnel must be almost constantly retained. Although not a direct finding of this study, observations of Redeye sections inicate that the combat effectiveness of any particular Redeye section would be increased if an NCO and/or officer is actually assigned to the section. (QL4)

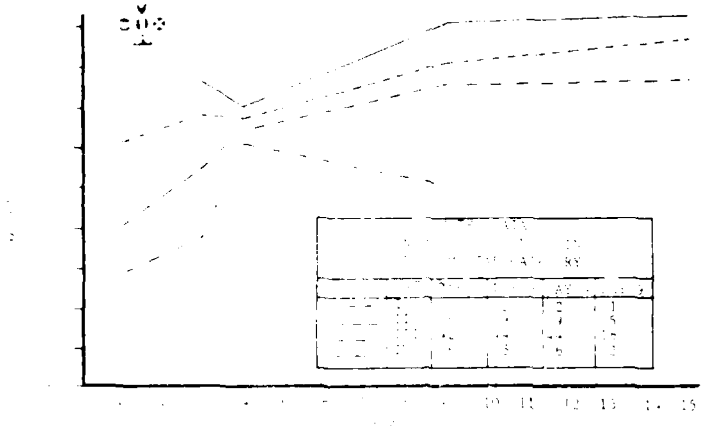
(b) Soldier quality.

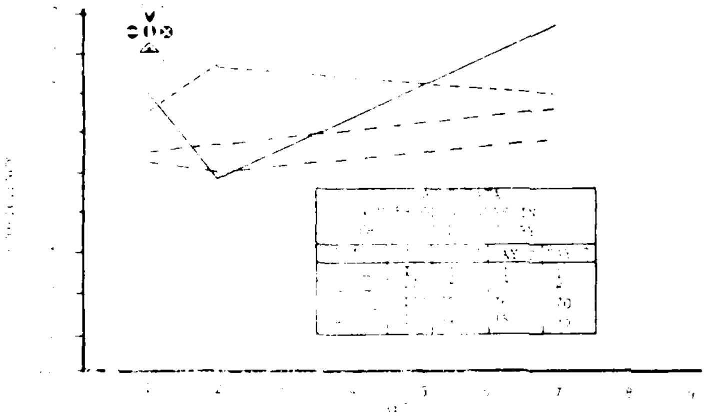
(1) Attitudinal data indicate soldier dissatisfaction with treatment in their units in that they are not properly used as Redeye gunners. Gunners feel they do not receive enough "hands-on" equipment training in either the MTS or during field exercises. This data, plus the survey findings concerning intent to reenlist, support a possible relationship between good training, job satisfaction and reenlistment. This may also indicate the importance of training leaders to employ the Redeye systems properly. (QL2)

(2) Survey findings showed that 65 percent of the Redeye gunners indicated their chances of reenlisting were less than 50 percent. In addition, almost 50 percent indicated that they will probably not make the Army a career. (QL2)

(3) With respect to trainability by mental category, the Redeye studies demonstrate that all mental categories were trained to an acceptable level of proficiency on the MTS in the alloted time in the institution. The proficiency of personnel in lower mental categories. (QL3)

[illegible] indicates the need for more frequent training for selected individuals if proficiency is to be maintained.





(c) Equipment.

(1) As already stated, the Stinger system (follow-on to Redeye) has a (QL4) complex KRP and IR tone system as well as an IFF capability. If the existing system, Redeye, is already so complex that many assigned personnel are unable to operate it at its design Ph, then it is reasonable to assume that Stinger will require a well designed supportive training package. This package should be developed in parallel with the weapons system. A Training Effectiveness Analysis is clearly warranted.

(2) One of the critical training implications of the Stinger system is how to handle the complex range ring profile and the 1/6 range ring coverage requirement for system activation. According to the results of this study, a system may have been developed which is very difficult to train. (QL4)

(3) As shown in the REDEYE study the Mean Ph achieved by gunners in the institution and unit on the MTS was: (Note: For study purposes unclassified Redeye System design Ph of .85 was used).

Redeye Institution Ph = .75
Redeye Unit Ph = .73

A series of computer simulations using the COMO III model conducted using the mid-1980 European scenario modified for the study based upon the RED air raid expected over a division size ground force. The purpose of these simulations was to evaluate the effect of Redeye proficiency in terms of Red kills as a function of proficiency. In these simulations the proficiency was varied from 0.1 to 1.0 probability of hit in increments of 0.1. Ten (10) Monte Carlo runs were made for each increment of proficiency from .1 to 1.0. Results indicate that kills of RED aircraft increase in relation to increases in Redeye gunner proficiency as shown below.

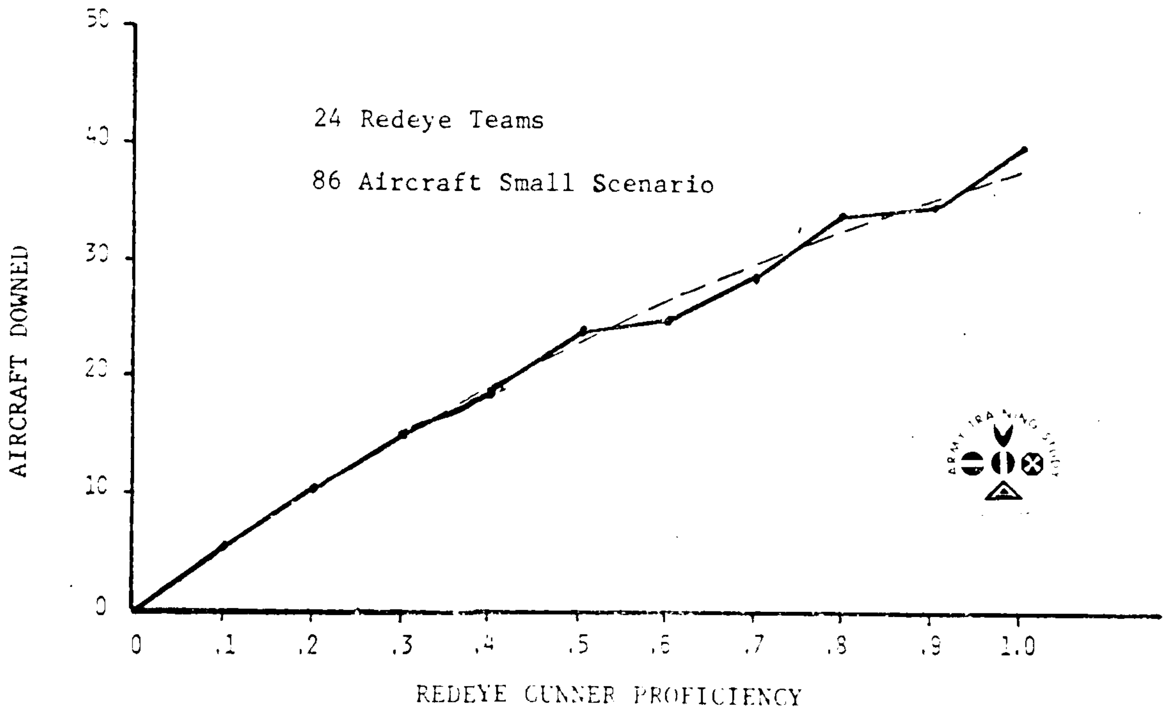


Figure 8. Aircraft Kills versus Gunner Proficiency (QL3)

The small scenario consisted of 86 aircraft and 24 REDEYE teams. As the proficiency increased from 0.1 to 1.0 the RED kills increased from 5.4 to 40.2. With input of the mean Ph values from institution and units the results varied from 31.6 to 30.7 kills, respectively. System design Ph input results in RED aircraft losses of 34.0. Therefore, current unit combat effectiveness, as measured by gunner performance on the MTS are appropriate 10 percent below design.

A second series of computer simulations were conducted which included I-HAWK and ROLAND air defense systems. The purpose of this large scenario was to evaluate the contribution of REDEYE when displayed with other systems. The REDEYE gunner proficiency was varied as before for ten (10) Monte Carlo runs for each increment of proficiency. Analysis of results showed the number of RED-aircraft killed increased as a function of REDEYE gunner proficiency from a low of 2.1 aircraft with .1 Ph to 16.7 aircraft with 1.0 Ph. Results of the large scenario are displayed below.

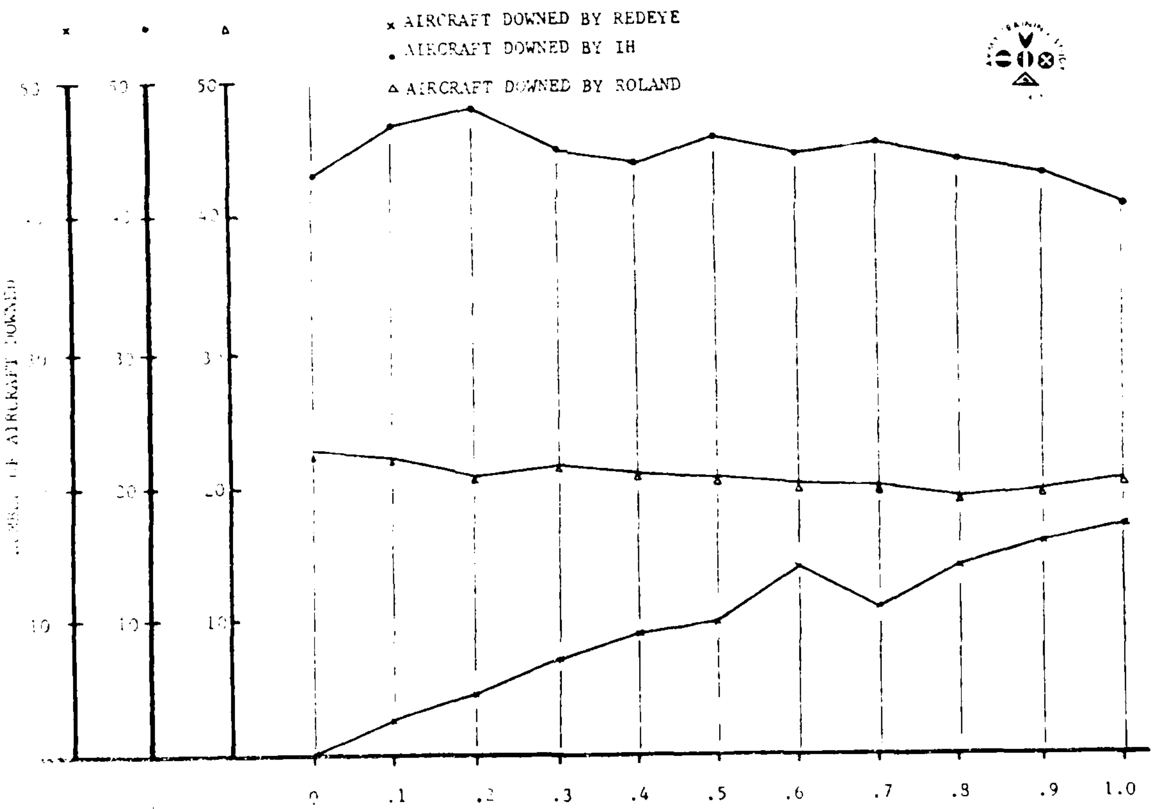


Figure 9. Aircraft Downed versus Redeye Proficiency (QI 3)

If the Ph values for the institution and unit are compared to system design probability of hit (Ph) the results vary between 13.3, 12.7, and 15.6 aircraft kills, respectively. Again, current levels of Redeye gunner combat effectiveness are computed at approximately 10 percent below design capabilities.

Care must be taken in analyzing the results of these simulations and comparing them to actual field conditions because they do not include actual average gunner reaction times or range estimations since gunner proficiency was measured on the MTS as opposed to actual firing. In lieu of these values, fixed values were taken from a previous study and modified to reflect errors from the range ring profile test given to all gunners surveyed.

Based upon a comparison of the results the following conclusions are drawn:

a There is a correlation between Redeye gunner proficiency (as measured by MTS Ph) and aircraft kills in which aircraft kills increase as gunner proficiency increases.

b Minor improvement can be made in both institutional and unit training programs so that Redey gunners perform at a proficiency closer to system design capabilities.

c It would appear that unit programs require further study to determine corrective actions required to eliminate or reduce the decay which occurs in Redeye gunners following graduation from AIT.

(4) The use of higher resolution war models which allow variation in values assigned to individual steps in the engagement sequence will allow more accurate determination of the relationships between those steps and decreased proficiency. Tied to these higher resolution war models is the need for increased instrumentation of the MTS to record the time at which a gunner performs each step in the engagement sequence. (QL3)

TOW Testing

Transferred to TEA 79 Program

Forward Observer Testing

Transferred to TEA 79 Program

63C/H SQT as a Measure of Proficiency

Transferred to TEA 79 Program

Final Report due December 1978

Proficiency Development Profiles for MOS 63C/H

a. Test status. As of 13 July 1978 both Active Army and National Guard material was received.

b. Responsible agencies. US Army Ordnance and Chemical Center and School.

c. Test synopsis. This test was designed to determine proficiency development profiles for 63C, track vehicle mechanic and 63H, tank automotive repairman, as a function of months in MOS, aptitude scores and rank and for various types of advanced individual training (AIT) programs. Soldiers tested were assigned to CONUS and USAREUR based active Army divisions and one National Guard division. Soldiers tested were in grades E1-E7. Data were collected using hands-on examinations and questionnaires. Tests used in the hands-on portion were selected to sample a broad spectrum of maintenance capabilities in the areas of remove and replace, align and adjust, and troubleshoot. Two performance tests were developed. The first evaluated 63C personnel grades E1-E6 and consisted of eight tasks. A second eight task test was designed to evaluate 63H soldiers, grades E1-E5. Two troubleshooting tasks included in this test were not skill level one tasks for 63H personnel. Although not taught in the 63H10 resident course, these two tasks were included to gather information concerning the degree to which the critical skill of troubleshooting is learned in the 63H maintenance environment. To collect additional troubleshooting data, a test consisting of four troubleshooting tasks was designed and given to 63H personnel, grades E6-E7. Common military vehicles such as the M151A1 and M60A1 were used for the testing. The tests were standard, and no attempt was made to restrict tasks to those performed by an individual MOS holder.

Additional data was gathered by use of questionnaires completed by both those soldiers tested and by their supervisors. Individual aptitude area scores and general ability information was obtained from MILPERCEN.

As the data was collected, it was coded and placed in a computerized data base. Summary reports, which were analyzed for possible errors, were generated as data was added.

d. Description of subtests. None

e. Sample sizes: Table One

	63C		63H		
	[illegible] GRADES	[illegible]	[illegible] GRADES	[illegible]	[illegible]
[illegible]		[illegible]		[illegible]	[illegible]
[illegible]	[illegible]				
[illegible]			[illegible]		[illegible]
[illegible]		[illegible]		[illegible]	

[illegible]

f. Summary of results, findings, and conclusions.

1. Summary of Key USAOCCS conclusions, results, and findings.

(a) While soldiers of all aptitude levels studied can learn the desired skills, if reinforcement does not occur, these fragile skills decay, with performance being consistently lower for low aptitude soldiers. Systematic on-the-job training (OJT) programs for maintenance personnel were not observed within the units visited. (QL4)

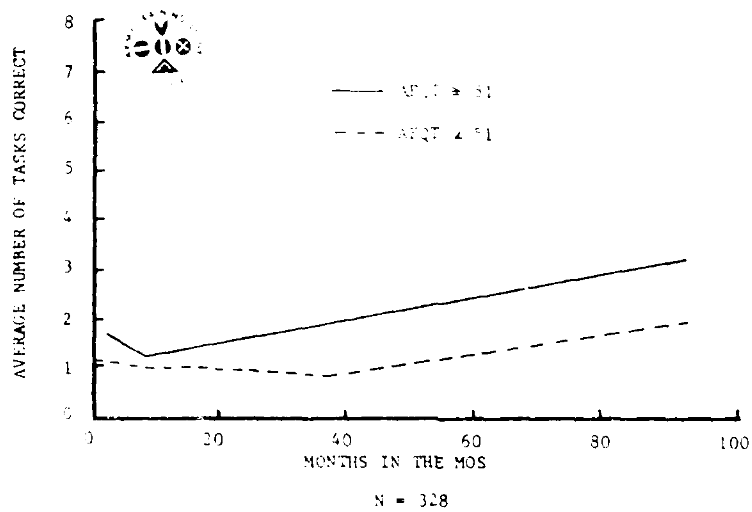


Figure 1. 63C Proficiency Curves for High and Low AFQT Groups with Zero Prompts (QL4)

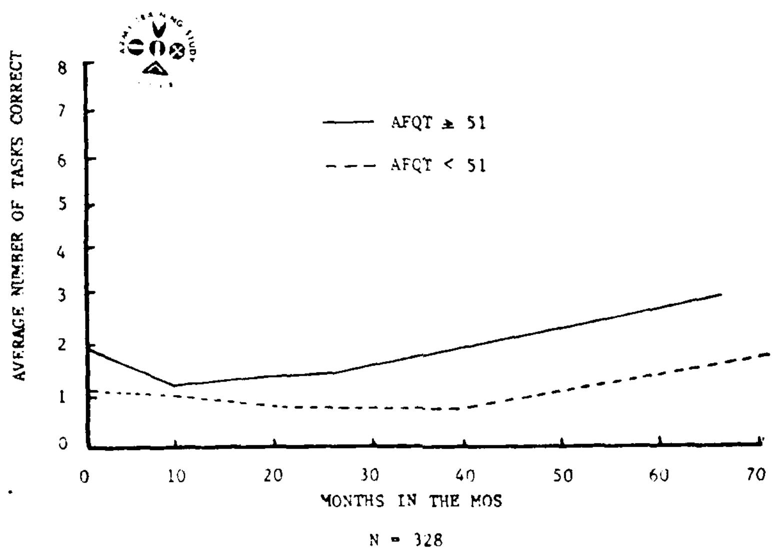
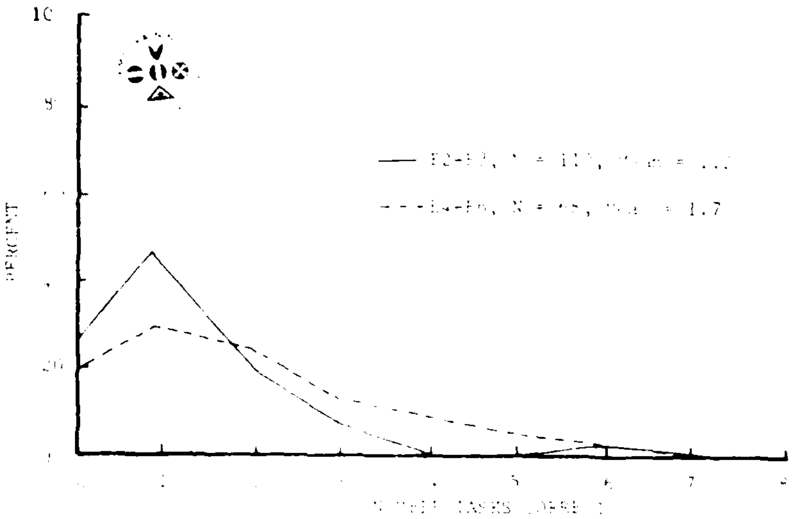


Figure 2. 63H Proficiency Curves for High and Low AFQT Groups with Zero Prompts (QL4)

(b) Many soldiers in grades E4-E7 did not appear to be more proficient than lesser experienced soldiers (E1-E3). In fact, tests showed that 63H E2-E3 slightly out-performed 63H E4-E5.



[illegible] and E4-E6 Performance for the [illegible] (No Supervision) [illegible]

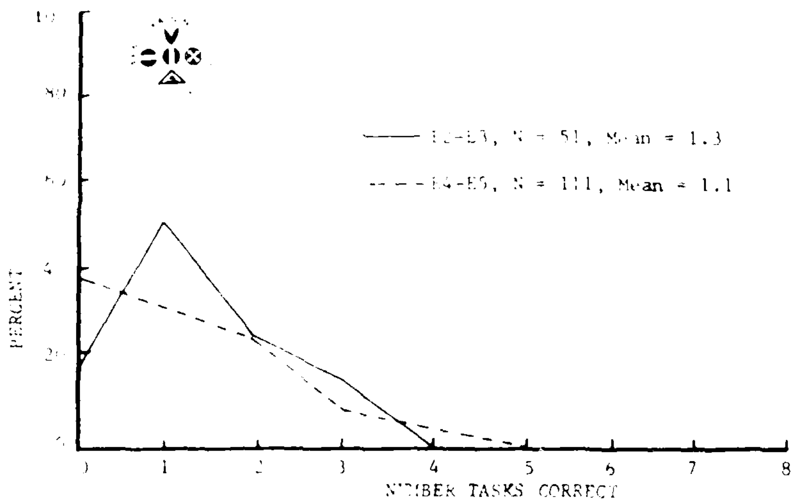


Figure 4. Comparison of 63H E2-E3 and E4-E5 Performance for the Zero Prompting Condition (No Supervision) (OL4)

(c) Operational availability would be reduced severely if availability depended primarily on indvidual diagnostic and repair proficiency. By using extraordinary management practices, such as over specialization of personnel and heavy reliance on replacement rather than repair, commanders and supervisors are currently able to maintain adequate equipment availability. If supply conditions were to change such that replacement components were not as fully available as they are currently (e.g., wartime conditions), these extraordinary management practices might fail with the potential result being a dramatic drop in equipment availability. The need for extraordinary management practices would lessen if systematic efforts were made in the field to increase the proficiency of maintenance personnel. Such efforts were not observed during the conduct of the test. (QL4)

(d) The concept of training and development maintenance personnel on a broad spectrum MOS basis as opposed to specific job or duty position requirements needs reevaluation at least until there are effective field sustainment training programs. (QL4)

(e) National Guard personnel in MOS 63C and 63H of the one unit visited performed at a generally lower level that their active Army counterparts on a broad spectrum of MOS tasks.

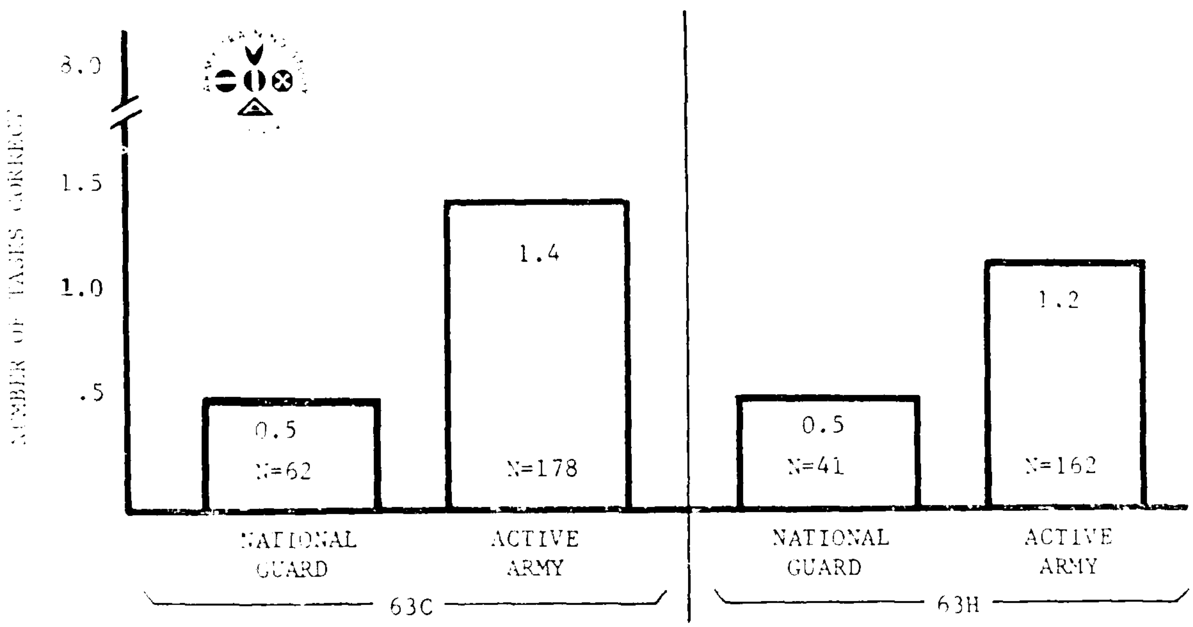


Figure 5. Comparison of Mean Performance Levels of 63C/H National Guard and Active Army for the Zero Prompting Condition (No Supervision) (QL4)

This generalization did not hold true for performance on the tank troubleshooting test administered to senior 63H soldiers. Mean performance levels though very low (less than 2 correct with prompting), are about equal, however, the National Guard sample size was small (n=8).

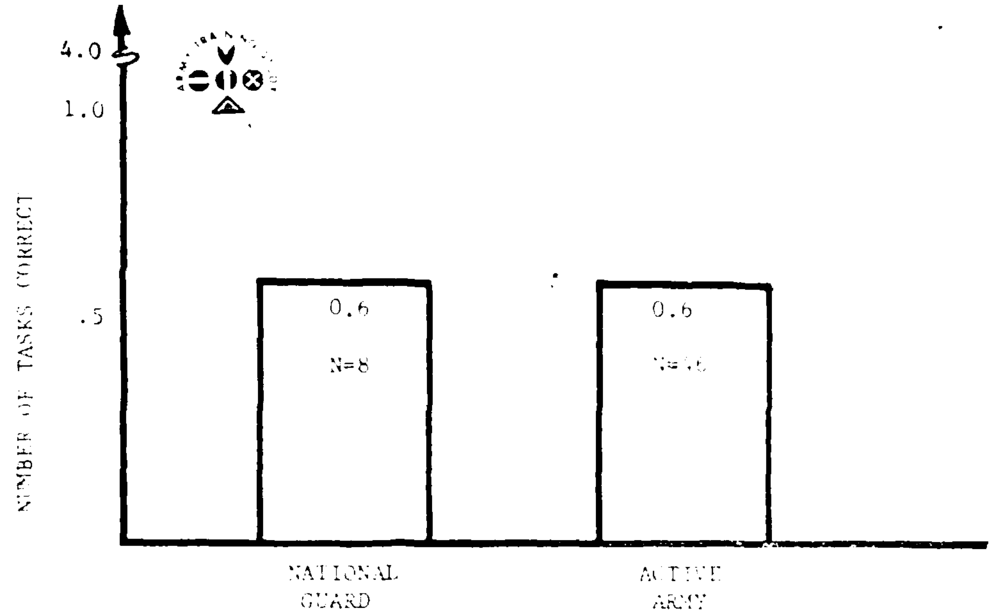


Figure 6. Comparison of Mean Performance Levels Between National Guard and Active Duty 63H Personnel for the Four Task Troubleshooting Test for the Zero Prompting Condition (No Supervision) (QL4)

Based upon the limited sample, the concept of training and developing National Guard maintenance personnel on a broad spectrum MOS basis should be reviewed in light of the inadequacies of unit training. Mobilization training for 63C and 63H soldiers should not be broad spectrum, but should be targeted at those tasks to be performed during activation. A differentiated training approach could not only do such targeting, but it could also take advantage of any prior mechanical experience of the soldiers mobilized. Correlation between the various predictor variables and test performances indicates a strong link among relevant training and experience and proficiency levels. While aptitude scores were not available for National Guard personnel, the relation between education and performance for 63H personnel indicates that ability is also an essential ingredient.

6. Arts Comments and Conclusions.

(a) While the difference in the average number of tasks completed correctly by higher and lower aptitude indivduals is measurable, both groups scored very low. Mechanical maintenance (MM) aptitude scores can be used to predict proficiency over time. Although this data follows the classic learning and retention curves as a function of ability, the spread (QL4)

between the number of tasks performed correctly was so small that no inference is made concerning this aspect of the test.

(b) The common phenomenon of specialization observed in units suggests that more frequent sustaining training is needed. While perception in the field may be that the present AIT curricula is too broad, the establishment of effective field sustainment training programs should remedy the problem. To meet the immediate needs, the broad scope of the MOS should be studied. Potentially, this could either shorten AIT or allow time for development of enhanced proficiency within a narrower spectrum of skills. Further, it reduces the scope of OJT programs. In the final analysis, actual job needs should determine the training base product. (QL4)

(c) A significant number of tasks taught to one-time proficiency during AIT appear to decay before graduation. This suggests that the USAOCCS should establish internal procedures to refresh those tasks during AIT so as to ensure that competence is still present at graduation. It is assumed that the retraining time would be considerably less than initial training time, hence, this does not necessarily imply significant changes in course lengths. (QL4)

(d) The procedural nature of maintenance tasks, the manifest symptoms of inaccurate performance (incorrect diagnosis, incorrect repair) and the high cost of alternative train-up strategies, appear to make this performance problem a prime candidate for the application of job aid technology and on-site TEC as an exported job training package. However, the 63C/H SWT observed broad-scale disinclination to use existing technical manuals, even when such use was encouraged during this test. It can be hypothesized that this reflects target population reading problems, inadequacy of existing TMs, and negative peer pressures. In any event, the precise causes of the present disinclination should be identified and neutralized or accommodated before implementation of a job-aid/TEC solution. The lack of viable OJT programs suggests that units lack either the resources or expertise (or both) to prepare and conduct such programs. In consonance with TRADOC philosophy, the proponent school has the obligation to design and develop training packages to fill this void. This problem suggests that on-site introduction of exportable training packages may be essential to ensure that they are used as designed. (QL4)

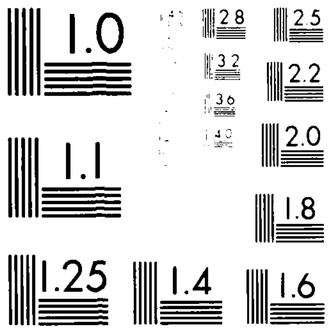
(e) The level of competence exhibited by supervisors is so unsatisfactory that it suggests immediate remedial action. Specifically broad scale diagnostic testing could be accomplished to determine if the sample tests were true indicators of supervisor competence. If they prove to be truly indicative, USAOCCS should consider establishing immediate programs, perhaps using mobile training teams and self-study job training packages to upgrade unit maintenance supervisors. Until supervisors achieve some minimum level of competence, it may be inappropriate to administer SQT 2 to skill level 1 personnel. (Q14)

(f) Some maintenance problems are so evident they can neither be unnoticed nor misinterpreted. For example, the conduct of the Tank Crew Turbulence Test was interrupted due to numerous equipment breakdowns. ARTS on-site observers reported some tank crewmen could not perform simple maintenance tasks. Thus, there may be a parallel lack of competence in operator maintenance. It may be that parallel efforts are needed in order to upgrade maintenance management and proficiency. (QL4)

(g) Data gathered from testing conducted at one National Guard unit supports the same conclusions as those drawn from the data gathered from active duty units. (QL4)

AD-A186 322 ARMY TRAINING STUDY: TRAINING EFFECTIVENESS ANALYSIS (TEA) SUMMARY(U) ARMY TRAINING AND DOCTRINE COMMAND FORT MONROE VA F J BROWN ET AL 08 AUG 78 4/4

UNCLASSIFIED SBI-AD-F000 106 F/G 15/1 NL



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

Cost effectivenes of Institutional and Unit Training Programs for MOS 63C and 63H

a. Test status. This test is complete.

b. Responsible agency. US Army Ordnance and Chemical Center and School.

c. Synopsis of study. Study objectives were to identify proficiency levels associated with various resident and OJT programs and to identify the costs and anticipated proficiency levels for various combinations of these programs. Data were collected on cost and effectiveness of four basic approaches to resident instruction as follows:

(1) Broad spectrum initial training via conventional approach to skill level 2.

(2) Initial conventional training to skill level 1.

(3) Initial self-paced training to skill level 1.

(4) Training to a higher standard during AIT.

Training costs were also investigated for low and high mental aptitude groups and individuals with different levels of preservice experience. Field data were collected using the hands-on examinations and questionnaires described in the Proficiency Development Profiles Test. Information on mental ability, AFQT and mechanical maintenance (MM) was obtained from historical records of recent AIT graduates. Aptitude and experience data was used in conjunction with course completion times to determine differences in time to complete the self-paced AIT course. Cost data for the institutional training program were obtained from Headquarters, TRADOC.

d. Description of subtests: None.

e. Sample size.

Category	Sample Size
AFQT Score	
less than 46 (CAT III B + IV)	142
46-62 (CAT III A)	62
greater than 63 (CAT I and II)	89

MM Score	Sample Size
90-100	142
101-110	124
111 +	95
Experience	
Garage experience (1 year or More)	22
Vocational/technical school automotive Training	32
Hobby	73
High school automotive training	24
No prior automotive experience or training	54

f. Summary of results, findings, and conclusions.

1. Summary of Key USACCS conclusions.

(a) Conclusions from this study build on the conclusions reached in the Proficiency Profiles Test and should be read in conjunction with the conclusions from that test. The only OJT program discovered was one designated to have the novice work with a more experienced soldier. In this case, the novice was being trained to perform presently assigned tasks. No OJT program geared toward the broad spectrum of the 63C or 63H MOS was found. Due to lack of a systematic unit training program, cost data was restricted to institutional training. Institutional training can be effective in developing broad spectrum maintenance capabilities in a relatively short period of time. While the mode of training, conventional or self-paced, does not seem to affect either the initial level of learning or the retention level, self-pacing usually results in a training time savings and is thus the most cost-effective. For the 63H, for example, the savings was over $3,000 per graduate. In analyzing the time taken to complete the self-paced course, while AFQT does not seem to be a discrminator, mechanical maintenance (MM) can, perhaps, be used. Considering the 63H10 course, it costs $6,346 to train those in the MM 90-100 group (a minimum score of 90 is required to enter the course); $6,021 for the 101-110 group; and $5,695 for the greater than 110 group. The difference, about $750, indicates that selection of higher ability soldiers by MM scores could reduce training costs by about 12 percent. (QL4)

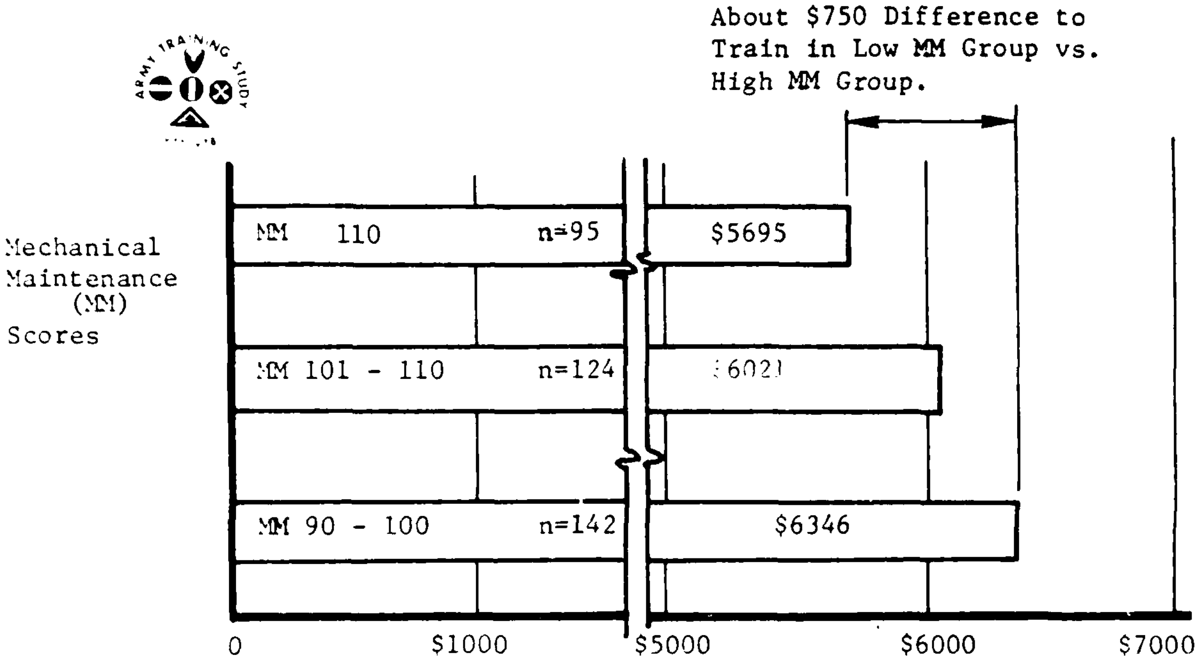


Figure 7. Comparison of Costs of Self-Paced 63H by Mechanical Maintenance (MM) Scores (QL3)

(b) Prior experience also seems to influence training time. One or more years of garage experience, vocational/technical school automotive training, and hobby experience reduce initial training time in the 63H course while having high school automotive training does not seem to result in any reduction of training time over the no experience group. A soldier with 1 or more years on the job as a mechanic can be trained for about $750 less than the soldier with no prior automotive experience. (QL4)

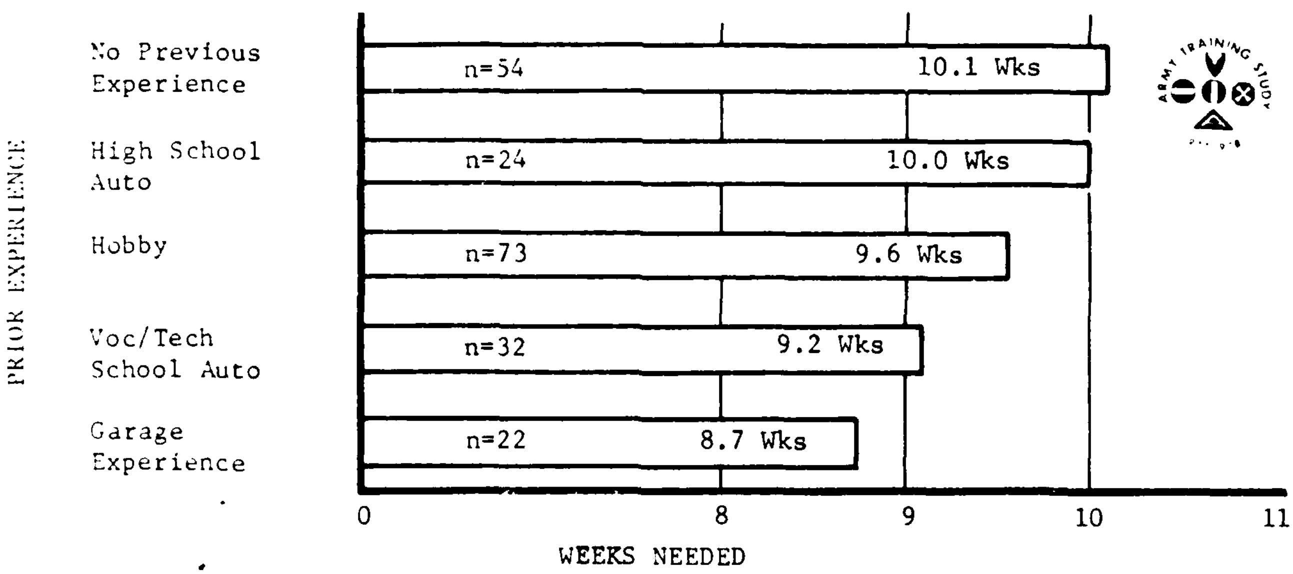


Figure 8. Comparison of 63H10 Self-Paced Course Completion Time with Prior Experience (QL4)

Proficiency developed during AIT decays very rapidly if not reinforced on the job. Available data indicates that performing remove/replace tasks and mechanical adjustments about once a year appears to produce a reasonable capability to perform with moderate supervision. A comparable capability for mechanical troubleshooting would require performance once evey three to four months. The capability to perform electrical troubleshooting tasks with moderate supervision would require performance more frequently than once each 4 months. Attaining and maintaining the capability to perform without supervision or assistance would require a higher frequency of reinforcement.

2. ARTS Comments and Conclusions.

(a) ARTS comments and conclusions for the Proficiency Profiles Test should be read in conjunction with those expressed below.

(b) Mechanical Maintenance (MM) scores and preservice experience have (QL4) been shown to be discriminators in training time for the 63H course. The personnel system currently uses MM as a prerequisite for entrance into the 63H10 course. Consideration should be given to adding preservice experience such as 1 or more years of garage experience, vocational/technical school automotive training, or hobby experience as another desired prerequisite. Diagnostic testing should be done to further explore these areas and determine if MM and various experiences are statistically valid discriminators for other Ordnance MOSs.

(c) While the preliminary retrain data presented here is valuable, (QL4) further diagnositc testing should be done. Supervisors may not currently be skilled enough to provide adequate supervision. Further testing is especially important if the AIT skill refresher exercises and exported job training packages are implemented.

(d) Perhaps some tasks, (i.e., electrical troubleshooting), are (QL4) performed so seldom that they should not be taught in the institution. Instead, a job aid could be proposed for those mechanics who must do this type of task.

Identify Optimum Distribution of Individual Training Between Institution and Unit.

a. Test status. Test is final.

b. Responsible agency. US Army Ordnance and Chemical Center and School.

c. Synopsis of test: None.

d. Description of substests: None.

e. Sample size: None.

f. Summary of results, findings and conclusions.

1. Summary of USAOCCS findings. Since systematic OJT programs were not found in field units, it was not possible to determine which tasks could be best taught in the field. Some insights, however, were obtained:

(a) Proficiency developed during AIT decays very rapidly if not reinforced. (QL3)

(b) Troubleshooting tasks must be performed more often than remove/replace tasks and machanical adjustments if proficiency is to be maintained.

(c) The most cost effective institutional training is training on those tasks that will be reinforced on-the-job at the appropriate interval. (QL4)

Determinations for Training Selected Personnel for Mobilization

a. Test status. This test is complete.

b. Responsible agency. US Army Ordnance and Chemical Center and School.

c. Synopsis of study. Data gathered in other USAOCCS tests and studies were added to information concerning the number of individuals completing automotive training programs in 1975-1976 and to data on the certification of automotive mechanics by the National Institute for Automotive Service Excellence (NIASE) to get insights concerning the pool of trained and experienced mechanics under the age of 30 years which exists in the civilian labor market.

d. Description of subtests: None.

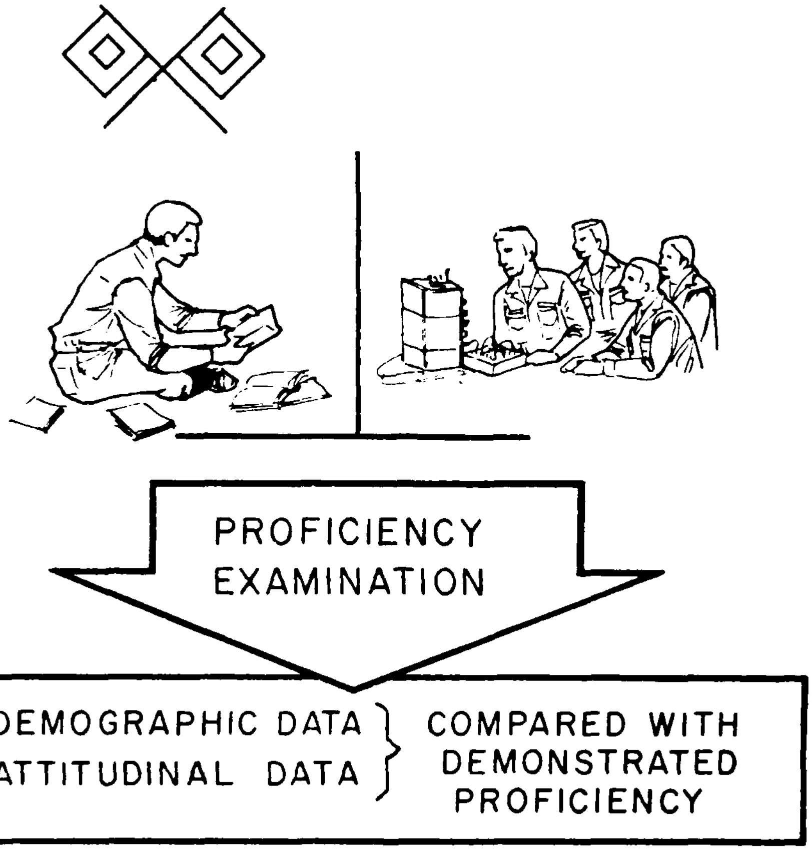
e. Sample size: Not applicable.

f. Summary of results, findings, and conclusions.

1. Summary of USAOCCS conclusions. Community colleges and trade schools graduate over 50,000 students from their automotive programs each year. The NIASE certifies approximately 20,000 mechanics under 30 years old, annually in one or more automotive areas. Currently there are about 65,000 certified individuals in the under 30 age group and approximately 10,000 of these are certified as general automotive mechanics. Such prior training and experience should reduce training time by 15-50 percent over that of nonexperienced individuals if self-paced instruction is used to capitalize on individual differences. (QL4)

2. ARTS comments and conclusions. Further study should be done to see if similar pools of talent exist in other areas. For example, the ham radio operator might be trained as a military communicator. Perhaps some of these highly skilled individuals could be quickly trained, using exportable training packages. They could be used as trained replacements relatively rapidly after mobilization. If pools of skilled civilians are to be relied upon for mobilization purposes, the civilians must be locatable. Some sort of accurate address file must be maintained. A study should be done to see if such addresses are being kept on files by civilian associations. (QL4)

Compare Task Performance of Self-Paced Graduates (05C/F)



a. Test status. As of 12 July 1978, no additional data reduction is contemplated. However, additonal data analysis is to be accomplished during TEA '79.

b. Responsible agencies. The test plan was developed by the 05C/F System Work Team (SWT) of the US Army Signal Center and Ft. Gordon (USASC&FG). This test was conducted in direct support of the Army Training Study to explore a pacing MOS from the combat support area.

c. Synopsis of test. The objective of this test was to evaluate the effectiveness and efficiency of the 05C program. Existing proficiency tests were used to gather data on group-paced and self-paced students. Demographic data was gathered from course records. Student attitudinal data were gathered using an end-of-course critique. Instructor and

supervisory attitudes toward the 05C self-paced and group-paced courses were gathered using a questionnaire developed for each.

d. Description of subtests. None.

e. Sample size. Fifty MOS 05B radio operators and 144 05F radio teletypewriter operators (non-Morse) who have been trained in the group-paced mode of instruction were utilized as the control group for purposes of providing baseline data for comparison. Thirty MOS 05C radio teletypewriter operators who have been trained in the self-paced mode of instruction were used as the experimental group in the study. Eight tasks were identified for data collection and comparison. All eight tasks were shared by two or more of the MOSs. Three tasks were commonly shared by all three MOSs.

f. Summary of results, findings, and conclusions.

1. USASC&FC findings are that the graduates of the self-paced 05C experimental group and the 05B and 05F control group performed equally well on the common tasks. Initial average course completion time for the 05C self-paced course was higher than the 05C group-paced course. As the course stabilized, however, average completion time decreased. Administrative procedures were identified as the probable cause for increased self-paced course completion time. Additionally, training holidays during the test period were alluded to as having been a factor in an earlier increased course length. A further causal factor may have been a lack of instructor training prior to the conduct of the self-paced course.

2. Similarly, the attrition of the 05C self-paced course increased (QL4)
significantly immediately following implementation. When compared over the long term, however, the attrition of the 05C self-paced course was comparable to that experienced in the group-paced courses. The instructor and supervisor survey data indicated that the 05C self- paced course produced a better graduate. The cost per graduate decreased for the self--paced 05C course. In summary, USAC&FG concluded that the 05C self-paced course produces an equally proficient graduate with approximately the same rate of attrition in slightly less time and at slightly reduced cost.

Test Proficiency of 05C/F Teams in Field Units

a. Test status. As of 12 July 1978, further data reduction and analysis are scheduled. Final report is due September, 1978.

b. Responsible agencies. The test plan was developed by the 05C/F System Work Team (SWT) of the US Army Signal Center and Ft. Gordon (USAASC&FG). This test was conducted in direct support of the Army Training Study to explore a pacing MOS from the combat support area.

c. Test synopsis. This test was designed to collect information in the following areas:

(1) Method and location of training for obtaining the MOS 05C.

(2) Demographic data.

(3) Attitude factors.

(4) Job holder profiles.

This study compared proficiency of 05C graduates of self-paced versus group-paced institutional training, and institutional training versus unit OJT. Proficiency was measured with a test consiting of a 66 item hands-on component and 44 written items requiring practical performance in the written mode.

d. Number of Subtests. None.

e. Sample size. The test sample consisted of 276 05C team members and supervisors from three active CONUS Infantry divisions, one Mechanized Infantry roundout bridgade, and one National Guard Armored divison. Due to time constraints and/or computer identification data, a test sample of 134 was usable out of the original population.

f. Summary of results, findings, and conclusion.

1. USASC&FC findings were that the 05C job holders who had completed group-paced training performed better on two or three written components of the test (radiotelephone and ratioteletype writer processing). Conversely, the 05C job holders who had completed self-paced training performed beter on four of five hands-on components of the test. The latter difference, however, was not statistically significant.

Compare Alternative Unit Training Programs

Transferred to TEA 79 Program

Validation of Anti-Armor REALTRAIN for Engagement Simulation

a. Test Status: As of 13 July 1978 the test had been completed and results published as Army Research Institute (ARI) Research Report 1191, "Initial Validation of REALTRAIN with Army Combat Units in Europe," dated October 1976.

b. Responsible Agencies. The test plan was developed by ARI in coordination with the TRADOC "REALTRAIN" mobile training team (MTT) implementing the "REALTRAIN" program in USAREUR. Data from the test are incorporated in the ARTS TEA through coordination between Director, Army Training Study and ARI.

c. Synopsis of test. A team from the Army Research Institute accompained the TRADOC MTT implementing the REALTRAIN training method in USAREUR. Training was conducted for 3 weeks at each of four divisional training areas over the period 3 November 1975 to 5 March 1976. Using nineteen collection forms, the research team gathered data on the training effectiveness of REALTRAIN, ways of improving REALTRAIN, and better methods to assess unit tactical performance. REALTRAIN exercises employ realistic combat engagement techniques for simulating weapons effects and weapons signatures. REALTRAIN training provides for the learning of tactical skills by Armor, Infantry, and Anti-Armor personnel in a combined arms environment. REALTRAIN implementation in USAREUR provided valuable research data for the evaluation of tactical performance by participants in the exercises, "player" and controller reactions to this new method, and the cost of conducting such exercises. The study had three broad research objectives:

(1) To measure the training effectiveness of the REALTRAIN method.

(2) To identify needs to refine REALTRAIN training techniques.

(3) To assess the methodology used for unit evaluation.

Participating players at each site were organized into A and B teams. A teams conducted REALTRAIN exercises for 3 weeks while B Teams rotated every week. Although many factors prevented the conduct of a clear cut experiment, the hypothesis was that the tactical performance of the A teams would improve over the 3 week training period.

Exercises were of two basic types: meeting engagements (N = 33) and attack/defense (delay) (N = 26). The force ratio was 1:1 in all exercises. An Armor platoon, two Infantry squads, and a TOW section were on each side. Although tactically unrealistic, the attackers' force ratio reflects the primary mission of the MTT which was to maximize cadre

training effectiveness rather than to measure REALTRAIN. As a result, effectiveness data from meeting engagements provide more reasonable REALTRAIN performance estimates than data from attack/defense exercises.

d. Description of subtests. None.

e. Sample size.

1. Sample size. Approximately 395 cadre personnel were trained as controllers with 542 Armor and infantry personnel serving as participants. A total of 59 exercises were conducted at four training sites. A summary of the type exercise by site is shown at Table 1 below.

	Type of Exercise		
Site	Meeting Engagement	Attack	Total
I	6	9	15
II	10	4	14
III	9	4	13
IV	4 (4)*	8 (1)	12 (5)
Total	29 (33)	25 (26)	54 (59)

*( ) Indicates a delayed activity

Table 1. Number and Type of Exercise by Site

f. Summary of results, findings, and conclusions.

1. Summary of ARI Findings:

(a) Training effectiveness results were impressively positive and consistent. A teams won 16 meeting engagements; B teams won 4; 13 resulted in ties. Casualty results show that in the third week across all sites, the vehicle casualty ratio (vehicles killed/vehicles played) was 0.36 for A teams, 0.52 for B teams; and personnel casualty ratios were similar. As measured by a weighted casualty index (WCI), the performance difference in favor of A teams in the third week was statistically significant. The difference between A team performance for the first and third weeks was also statistically significant. B teams showed no difference in performance between the first and third weeks. (QL3)

(b) Interviews and questionnaires from controllers and participants also reflect a very favorable, even enthusiastic, attitude toward REALTRAIN effectiveness. Participants and controller trainees alike (QL3)

reacted enthusiastically to the REALTRAIN program, citing its realism and the learning opportunities in the combined arms operations, cross-training, development of battlefield confidence, and team work in tactical maneuvers.

(c) Overall results on weapons effects show: (QL3)

(1) 41 percent of the tanks played were destroyed, mostly by other tanks.

(2) 43 percent of the infantry were killed, mainly by small arms.

(3) 39 percent of TOWs were destroyed, mostly by artillery and other TOWs.

(4) 51 percent of the APCs were destroyed, mostly by artillery and tanks.

(d) Table 2 presents the results of the meeting engagement missions over weeks of training. Remembering that the A team remained at each site for 3 weeks while the B team changed each week, it may be seen from the table that the A teams tended to win more engagements during the second, third, (and fourth) weeks. (QL3)

Week of Training	A Team Win	B Team Win	Tie	Total
1	3	3	4	10
2	6	0	4	10
3 (4)	4 (3)	0 (1)		9 (4)
Total	13 (16)	3 (4)	'3	29 (33)

Table 2. Meeting Engagements by Team and Week of Training

(e) Training effectiveness results. (QL4)

Determining the effectiveness of REALTRAIN was the major concern of the REALTRAIN research project. As explained, performance of combined arms teams having only one week of REALTRAIN training (team B) was compared with that of teams having 1, 2, and 3 weeks of REALTRAIN experience.

The analyses compared the performance of teams A and B across the 3 weeks of REALTRAIN experience. The five analyses attempt to isolate variables discriminating between the two team types. Most of these attempts were successful. Where not successful, the direction of required further analyses is discussed.

(f) Training effectiveness reflected by casualties incurred. The casualties incurred by both sides are the primary objective data in a REALTRAIN exercise. When tactical proficiency increases, casualties should change in two ways. A combat unit should, by use of proper cover, concealment, and movement techniques, decrease the casualties incurred and, by more effectively using its weapons, increase kills inflicted on the opposing force. (QL4)

Results are shown by type of exercise--meeting engagement or attack/ defense (delay)--so that data trends can be clearly seen.

(g) Meeting Engagements: Tables 3 - 6 show the percent casualties incurred by team A and team B for each week of training for tanks, Infantry, APC, and TOW. (QL4)

	Week 1	Week 2	Week 3
A Team	48 Percent	35 Percent	36 Percent
B Team	45 Percent	46 Percent	67 Percent
	n = 10	n = 10	n = 9

Table 3. Comparison of Tank Casualties for Team A and Team B Meeting Engagements

Table 3 shows that both teams had incurred approximately the same casualties during the first week. By the third week, however, a significant difference is evident in that team B received nearly double the casualties of team A.

	Week 1	Week 2	Week 3
A Team	34 Percent	40 Percent	30 Percent
B Team	49 Percent	36 Percent	55 Percent
	n = 10	n = 10	n = 9

Table 4. Comparison of Infantry Casualties for Team A and Team B Meeting Engagements

Table 4 data demonstrates a similar learning/performance advantage accruing to "REALTRAIN" trained units over time.

(1) Infantry casualties are not as clear-cut as tank casualties. While there was a demonstrable performance difference during the third week of training between the two teams, performance during the first two weeks is not easily interpreted. Two factors may explain this. First, Infantry squads must initially learn to work as a cohesive unit, not as individuals. Second, after learning to work as a unit, Infantry must work with Armor personnel in a combined arms role, learning to move, shoot, and communicate with their Armor counterparts if the team is to be effective.

Table 4 indicates that by the third week, the A teams were beginning to get things "together"--reducing the casualties incurred on themselves and increasing the casualties inflicted on the B teams.

	Week 1	Week 2	Week 3
A Team	60 Percent	45 Percent	35 Percent
B Team	55 Percent	65 Percent	40 Percent
	n = 10	n = 10	n = 9

Table 5. Comparison of APC Casualties for Team A and Team B Meeting Engagements.

(2) Table 5 indicates that over the 3 weeks of training, team A's APC casualties tended to decrease weekly (60 percent in week 1 to 35 percent in week 4). For team B, casualties decreased 27 percent from week 1 to week 3.

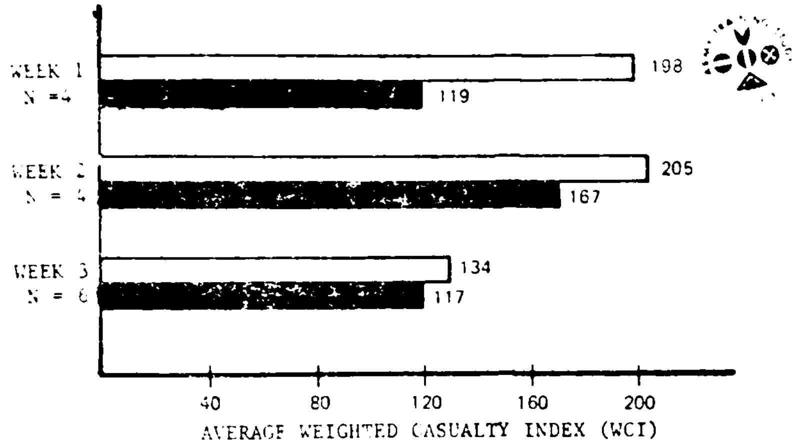
	Week 1	Week 2	Week 3
A Team	90 Percent	19 Percent	33 Percent
B Team	90 Percent	50 Percent	44 Percent
	n = 10	n = 10	n = 9

Table 6. Comparision of TOW Casualties for Team A and Team B Meeting Engagements

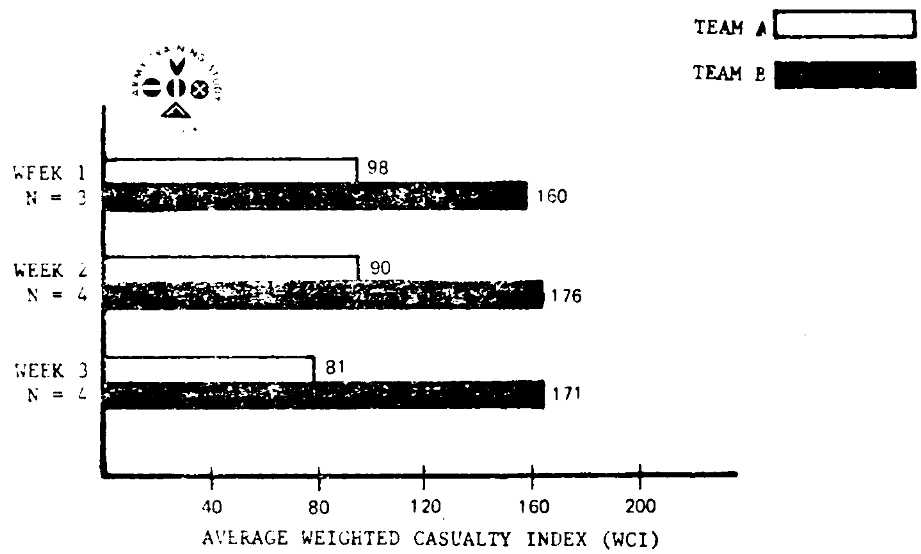
(3) Table 6 shows that both teams lost most of their TOWs during the first training week. There was a very noticeable decrease in TOW casualties during the second and third weeks of training, with team A showing the greatest decrease.

The use of the weighted index (WCI) allows diverse data categories to be integrated into a single measure. Weightings in the WCI are based on expert military judgement and are in general agreement with weightings in other firepower indices. An area for important future research may be to test empirically various data aggregation indices by using simulation techniques such as REALTRAIN.

(4) Table 7 shows the average WCI for team A attacks and team B attacks by training week. The top of the figure shows that by Week 3, team A in the attack was able to reduce combined casualties by 32 percent (from a WCI of 198 in Week 1 to 134 in Week 3); the team B index was approximately the same for weeks 1 and 3 (week 1: 119, week 3: 117). The bottom portion shows that when Team B was in the attack, the combined index for team A went from 98 in week 1 to 81 in week 3, a decrease of 17, while the team B casualty index increased slightly (from 160 to 171).



TEAM A ATTACKS



TEAM B ATTACKS

Table 7. Weighted Casualty Index (QL3)

(h) Significant Army Training Study findings. Analysis of the research report reveals the following:

(a) The improvement of both REALTRAIN and non-REALTRAIN trained teams (QL3) reinforces data obtained from the tank crew turbulence research which concluded that intense, structured training to specific tasks, conditions,

and standards (modular training) can result in improved proficiency over short periods of time. While A teams (REALTRAIN) could be expected to demonstrate superior performance, it is also significant that B teams generally improved relative performance even in face of an Opposing Force which was improving at a greater rate. The exception to this is the tank blue teams which did not seem to be capable of offsetting REALTRAIN induced A team advantages.

(b) The large improvements demonstrated weekly by both groups are consistent with the low starting proficiency of units which has been noted in ARTS TEA test results in both CONUS and USAREUR. Unit training programs are not training to the potential represented by the personnel and equipment being provided. (QL3)

REALTRAIN Validation for Rifle Squads

a. Test status as of 13 July 1978.

1. Validation of the mission accomplishment Research Report 1192 was published by the US Army Research Institute (ARI) in October, 1977.

2. Validation of the tactical performance draft research report was completed in June and a copy was forwarded to the Director, Army Training Study on 13 July 1978.

b. Responsible agencies. ARI, in coordination with the US Army Training and Doctrine Command (TRADOC), has developed a research program to validate the tactical engagement simulation training method known as REALTRAIN. These research projects were conducted by ARI and sponsored by TRADOC.

c. Synopsis of tests. Two tests were conducted to validate REALTRAIN for rifle squads. These tests are hereafter referred to as Rifle Squad I (RSI) and Rifle Squad II (RSII).

I. Rifle Squad I.

(a) The objective of RSI was to compare and evaluate the mission accomplishment and casualty rates of Infantry rifle squads trained with REALTRAIN methods and those of similar squads which received conventional field training.

(b) Procedures.

(1) In phase 1, participating Infantry squads engage in a pre-training test field exercise to establish pre-training performance levels. This pre-training test included a movement to contact and hasty attack against a machine gun outpost, and a hasty defense against a skilled squad-sized opposition force.

(2) Phase II provides 3 days of carefully coordinated training by REALTRAIN methods for nine squads, and by conventional methods for nine squads.

(3) Phase III, the post-training test repeated the pre-training test on different terrain, to establish performance improvement after training.

d. Description of subtests. Pre-training test and post-training test were conducted for each squad as outlined in procedures above.

e. Sample size. Eighteen rifle squads of nine men each participated. Nine squads were trained with REALTRAIN and nine squads were conventionally trained.

f. Summary of results, findings, and conclusions.

1. Summary of findings:

(a) Results were assessed in terms of mission accomplishment--successful attack or defense--and casualties sustained versus casualties inflicted.

(b) All squad performances in the pre-training test were the same. Conventionally trained sqauds did little better in post-training test than they had in the pre-training test. REALTRAIN squads did significantly better on the post-training test with regard to the number of successful attacks and defenses. REALTRAIN squads also sustained relatively fewer casualties, inflicted more casualties, and took more time to attack than did the conventionally trained squads. In the shoot-off, REALTRAIN squads succeeded in accomplishing both attack and defense missions more frequently than did the conventionally trained squads opposing them, and the REALTRAIN squads had more favorable casualty exchange ratios. (QL3)

(c) Results from this portion of the field assessment of REALTRAIN provide empirical evidence, gathered under a systematic and comprehensive field research program, of the greater effectiveness of REALTRAIN over conventional combat unit training for Infantry rifle squads. The Army is using REALTRAIN methods now. These methods will form the core of a total engagement simulation system for training and evaluation. (QL3)

II. Rifle Squad II.

a. Synopsis of tests. The objective of RSII was to compare and evaluate the tactical performance of rifle squads trained with REALTRAIN engagement simulation methods, and rifle squads trained by conventional combat field training methods.

1. Procedure:

(a) In phase I, participating rifle squads engaged in a pre-training test field exercise to establish pretraining performance levels. This pre-training test included a movement to contact and attack against a 4-man outpost, and a hasty defense against a skilled squad-sized opposition force.

(b) Phase II provided 3 days of carefully coordinated training by REALTRAIN methods for nine squads, and by conventional methods for nine squads.

(c) Phase III, the post-training test, repeated the pre-training test on different terrain in order to establish performance improvement after training.

(d) In Phase IV, each squad conducted two attacks and two defenses against squads of the other training group (shoot-off exercise).

b. Description of subtests. A pre-training test and a post-training test were conducted for each squad as outlined in procedures above.

c. Sample size: Eighteen rifle squads of nine men each participated. Nine squads were trained with REALTRAIN and nine squads were conventionally trained.

d. Summary of results, findings, and conclusions.

1. Summary of findings.

(a) Results were assessed in terms of mission accomplishment, casualties exchanged, and intermediate tactical performance.

(b) REALTRAIN squads showed a dramatic improvement across a variety of performance measures following three days of tactical training. In contrast, conventionally trained squads showed little improvement following training. The performance of REALTRAIN and conventional squads were similar during pretesting exercises. More specifically, during post-training tests, REALTRAIN squads performed better than conventionally trained squads during the attack in that they: (QL3)

(1) Accomplished more missions.

(2) Inflicted more casualties.

(3) Sustained fewer casualties.

(4) Used cover and concealment more effectively.

(5) Were more likely to use overwatch procedures.

(6) Were more likely to use suppressive fires.

(7) Were more likely to employ the M60 machine gun.

(8) Were more likely to use the M60 machine gun to cover the maneuvering element.

(9) Were more effective in the use of hand grenades.

(10) Were more likely to attack the defender's more vulnerable flank.

(11) Were more likely to be actively controlled by a leader.

(12) Were more likely to perform as an integrated unit.

(c) Similarly, REALTRAIN squads performed better than conventionally trained units during the defense in that they: (QL3)

(1) Accomplised more missions.

(2) Inflicted more casualties.

(3) Sustained fewer casualties.

(4) Were more likely to use an OP.

(5) Were more likely to deploy their more vulnerable flank.

(6) Were more likely to place claymore mines to cover most likely route of enemy advance.

(7) Made fewer and less basic errors in employment of claymore mines.

(8) Were more likely to make early detections of the OPFOR.

(9) Were more likely to open fire before the OPFOR.

Thus, REALTRAIN units showed a dramatic improvement in tactical performance during post-training tests, and they were far superior to conventional squads. In addition, performance on intermediate tasks correlated highly with terminal mission outcome.

2. Conclusions.

(a) The results have shown the REALTRAIN training can dramatically increase the tactical proficiency of rifle squads. Increases in the quality of tactical performance occurred across a broad range of measures. Performance on intermediate tasks was closely related to mission outcome.

(b) Present rifle squad ARTEPs do not provide a substantial amount of guidance for trainers to diagnose specific training deficiencies. Table 1 and Figures 1 through 7 display data on selected areas of REALTRAIN versus conventionally trained rifle squads.

Mean number of caualities sustained by tested squads in the attack

	Training Method	
	RT	CT
Pre-training test	7.9	8.0
Post-training test	6.1	7.8

Mean number of casualities sustained by test sqauds in the hasty defense

	Training Method	
	RT	CT
Pre-testing test	8.0	7.9
Post-training test	5.3	7.6

Mean number of casualties inflicted on OPFOR in the attack

	Training Method	
	RT	CT
Pre-training test	.4	.3
Post-training test	2.4	.6

Mean number of casualties inflicted on OPFOR in the hasty defense

	Training Method	
	RT	CT
Pre-training test	4.4	4.0
Post-training test	8.5	4.0

Mean number of casualties sustained by tested squads in shoot-off attacks and defenses

	Training Method	
	RT	CT
Attack	4.6	6.9
Defense	1.7	2.8

Table 1. REALTRAIN (RT) vs Conventionally Trained (CT) Pre and Post-training Comparisons

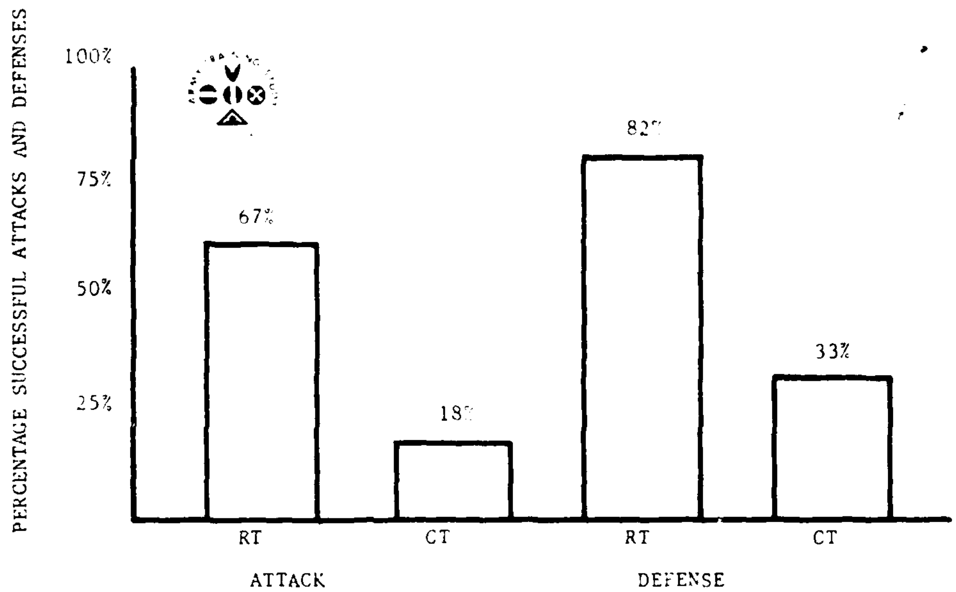


Figure 2. Percentages of Sucessful Attacks and Defenses by REALTRAIN and Conventionally Trained Units During Shoot-Off Trials (QL3)

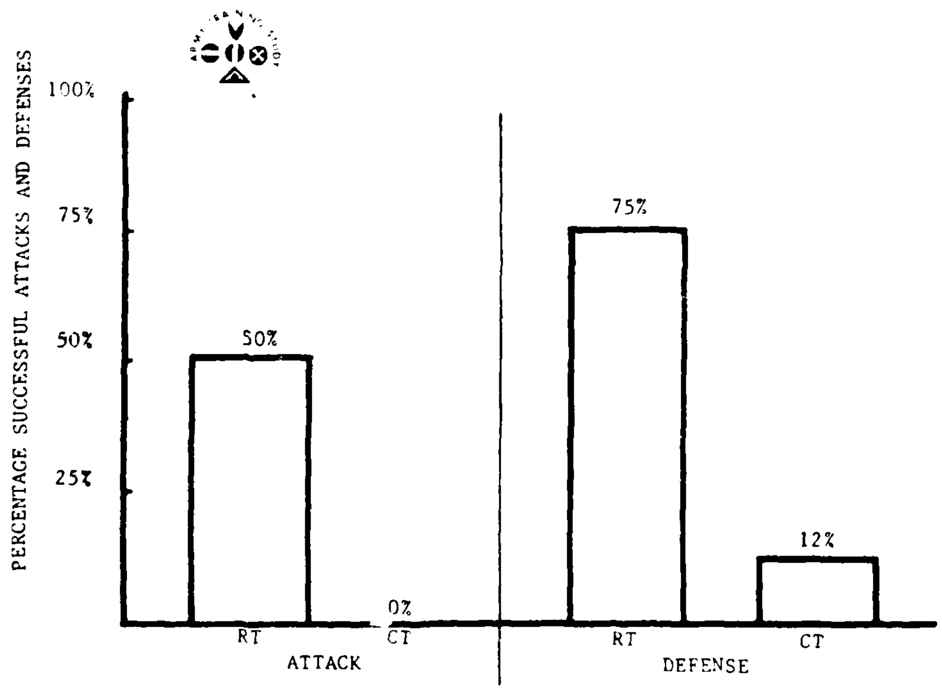


Figure 1. Post-training Mission Accomplishment for REALTRAIN and Conventional Units: Attack and Hasty Defense (QL3)

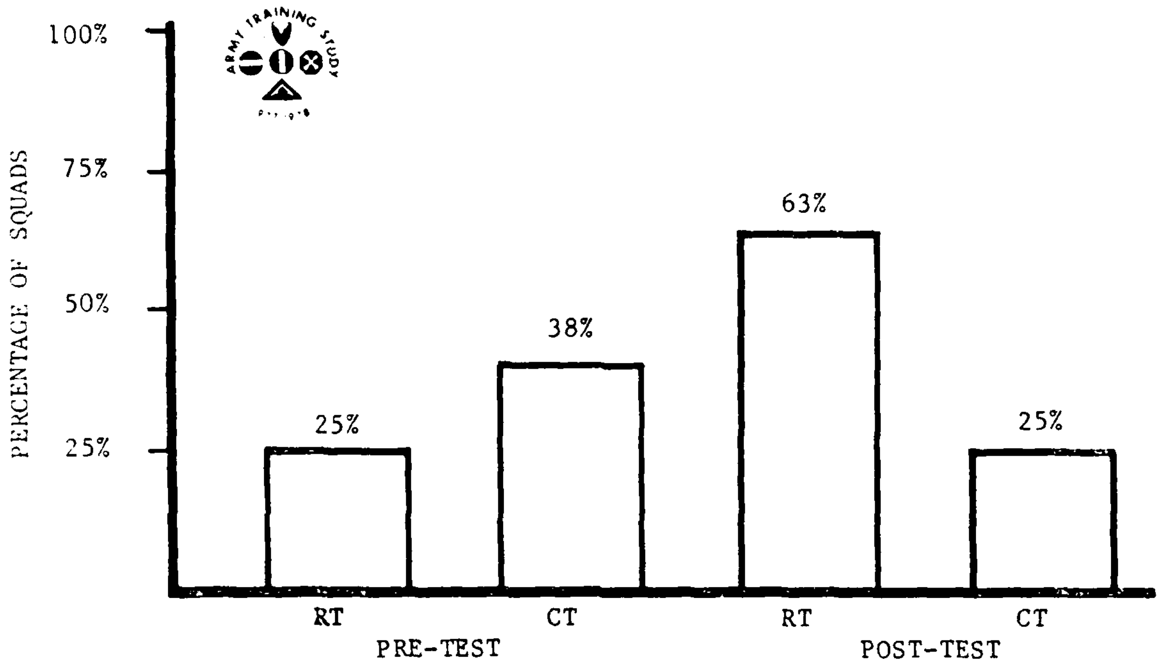


Figure 3. Percentage of Squads who "Stalled in Place" at the Initiation of the Engagement at the OP (QL3)

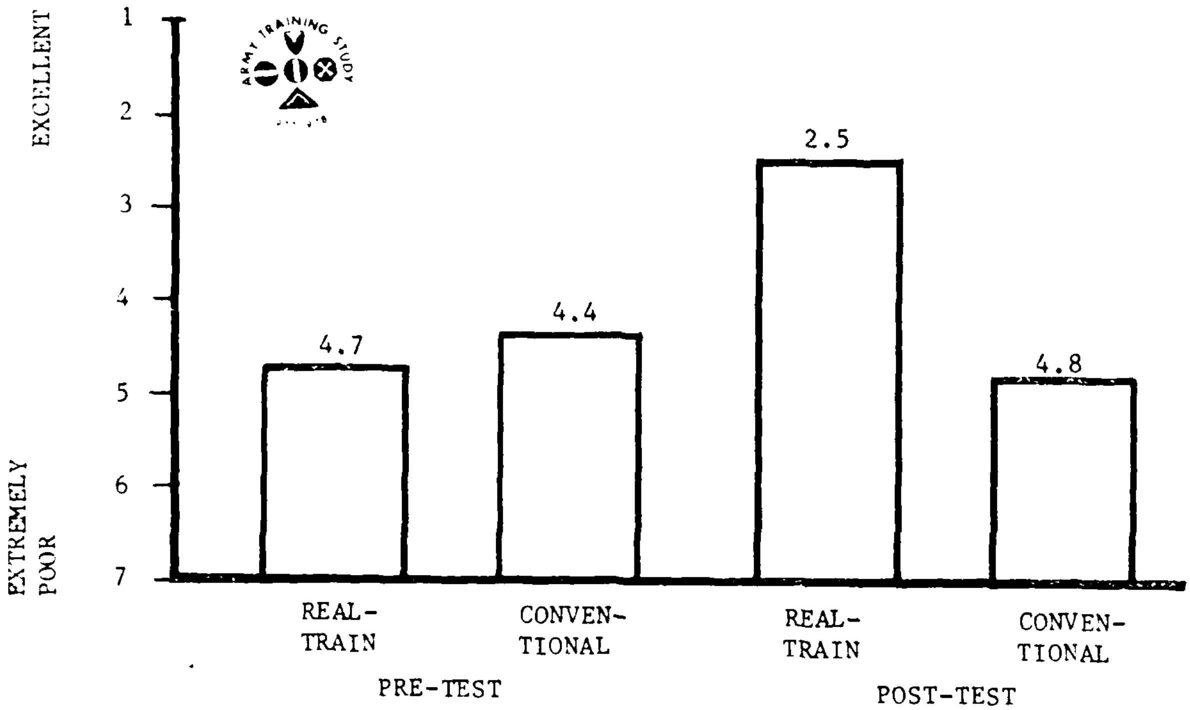


Figure 4. Evaluation by OPFOR Controllers of Squad Use of Cover/Concealment During Attack on OP (QL3)

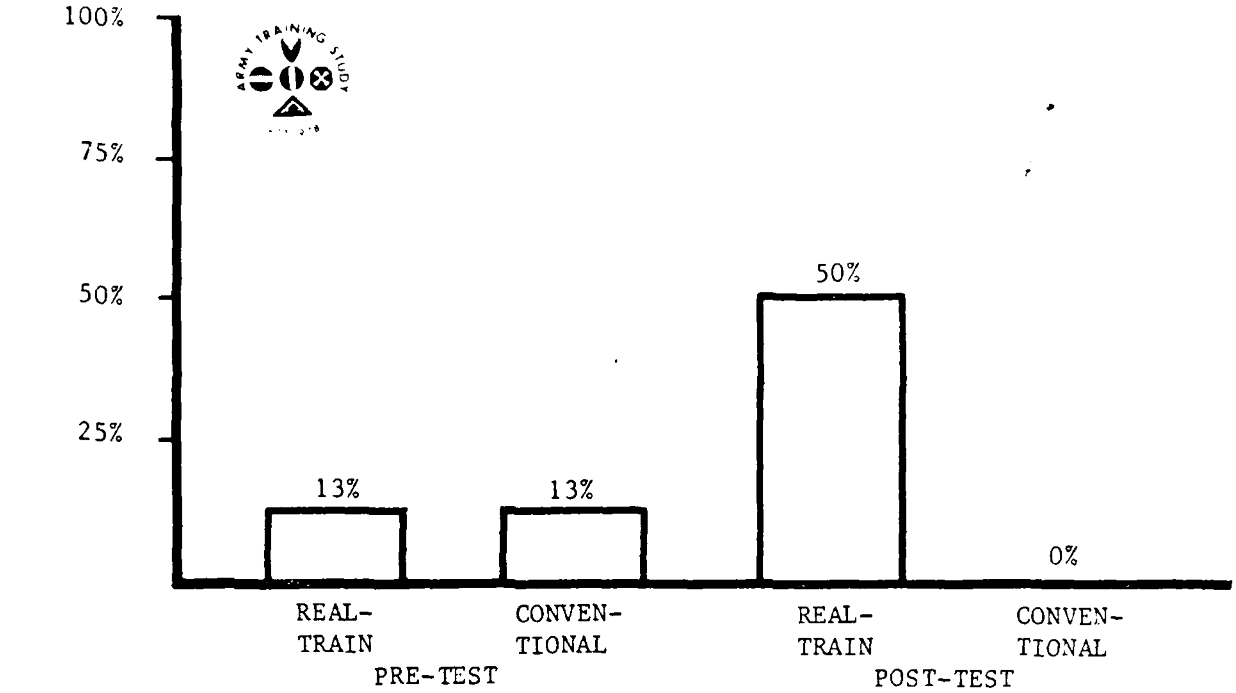


Figure 5. Percentage of Squads in Which One Element Provides Overwatch for Another Element During the OP Engagement (QL3)

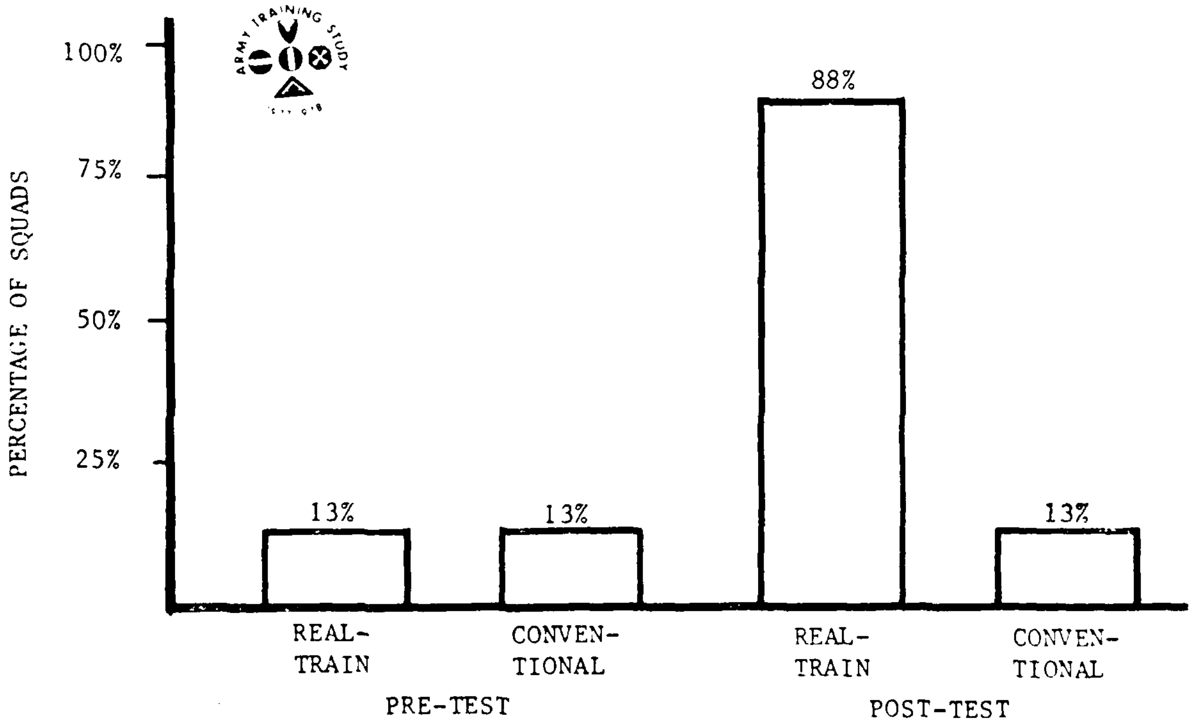


Figure 6. Percentage of Squads Using M60 to Form Base of Fire Concurrent with Initial Attempts to Maneuver Against the OP (QL3)

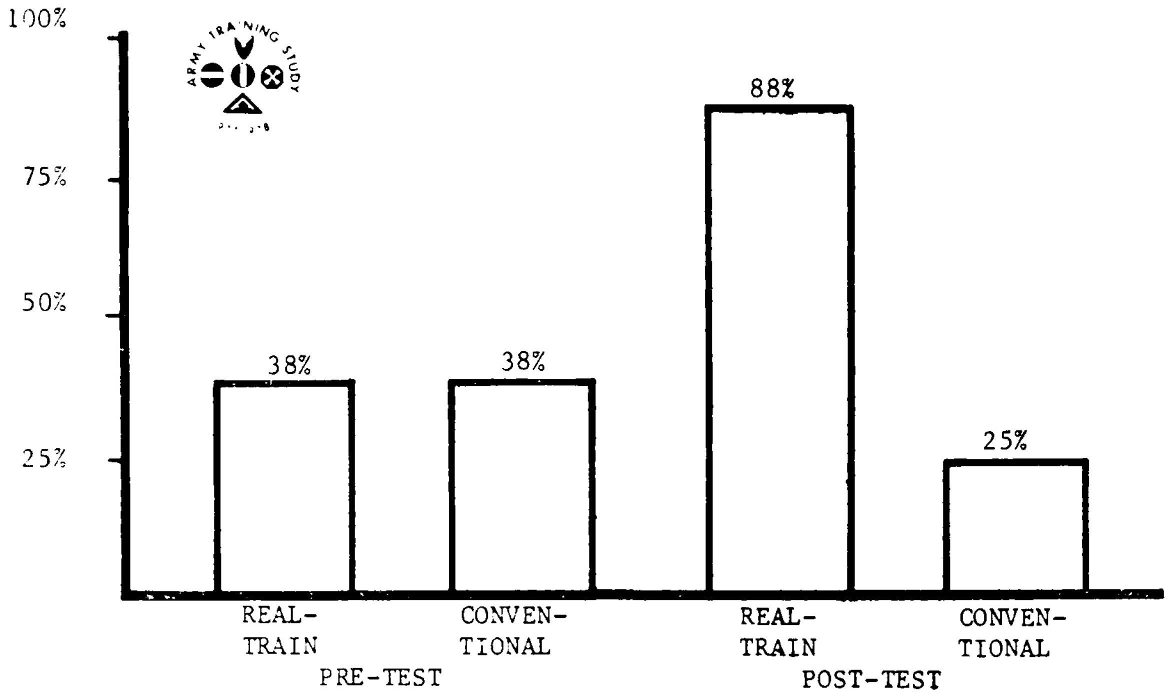


Figure 7. Percentage of Squads Making an Organized Flanking Maneuver at the OP (QL3)

3. Summary of ARTS findings. Analysis of the data contained in the tactical reports reveals the following:

(a) These research results support the findings of the Tank Crew Turbulence Test wherein the conduct of intersive training, narrowly focused on precise tasks, conditions, and standards, results in an increase of individual and collective proficiency in relatively short periods. Analysis of pre and post-training test casualty comparisons confirms the progress of the REALTRAIN trained squads. It is important to note that the conventionally trained squads also suffered fewer casualties after 2 weeks of training even though they were opposed by an enemy at that time who was much more proficient than during the pre-training test. (QL4)

(b) Casualties sustained by all squads during the pre-training test are a measure of the low level of collective proficiency existing in units today. (QL4)

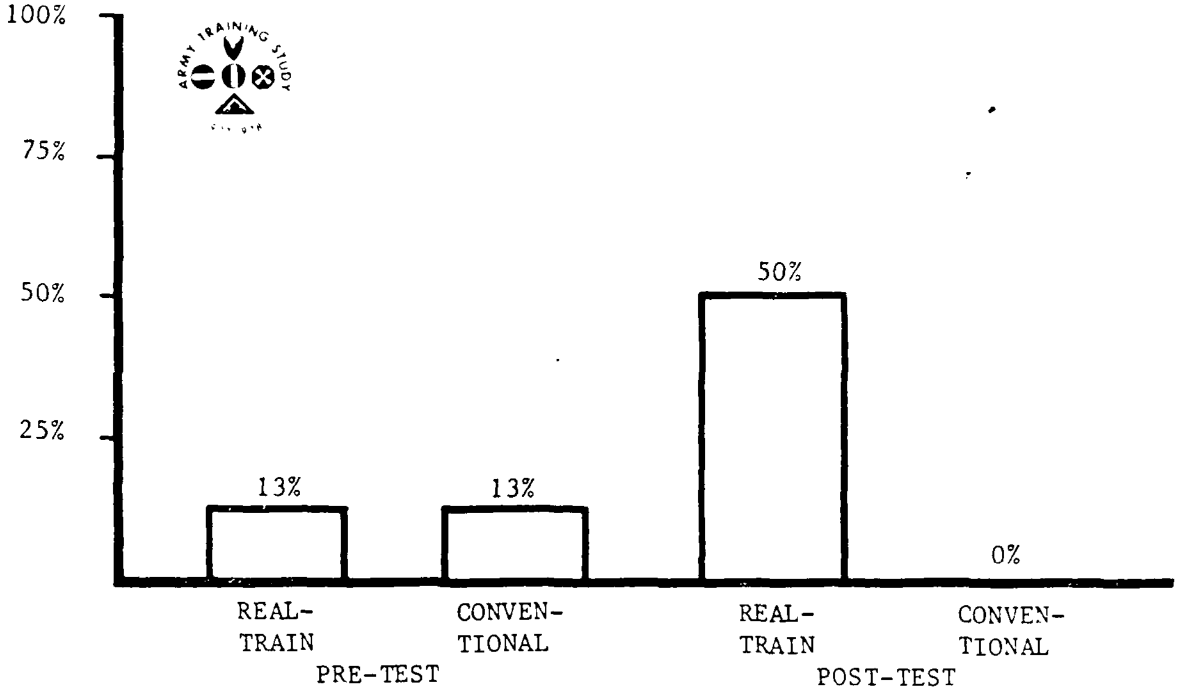


Figure 5. Percentage of Squads in Which One Element Provides Overwatch for Another Element During the OP Engagement (QL3)

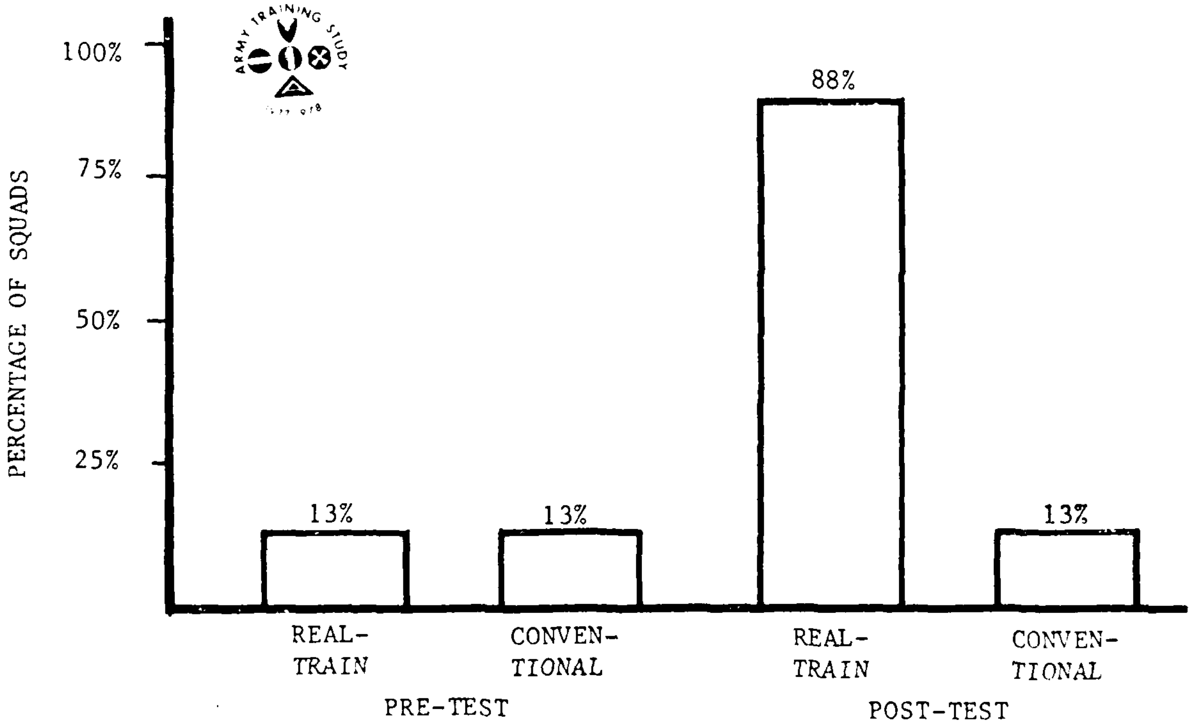


Figure 6. Percentage of Squads Using M60 to Form Base of Fire Concurrent with Initial Attempts to Maneuver Against the OP (QL3)

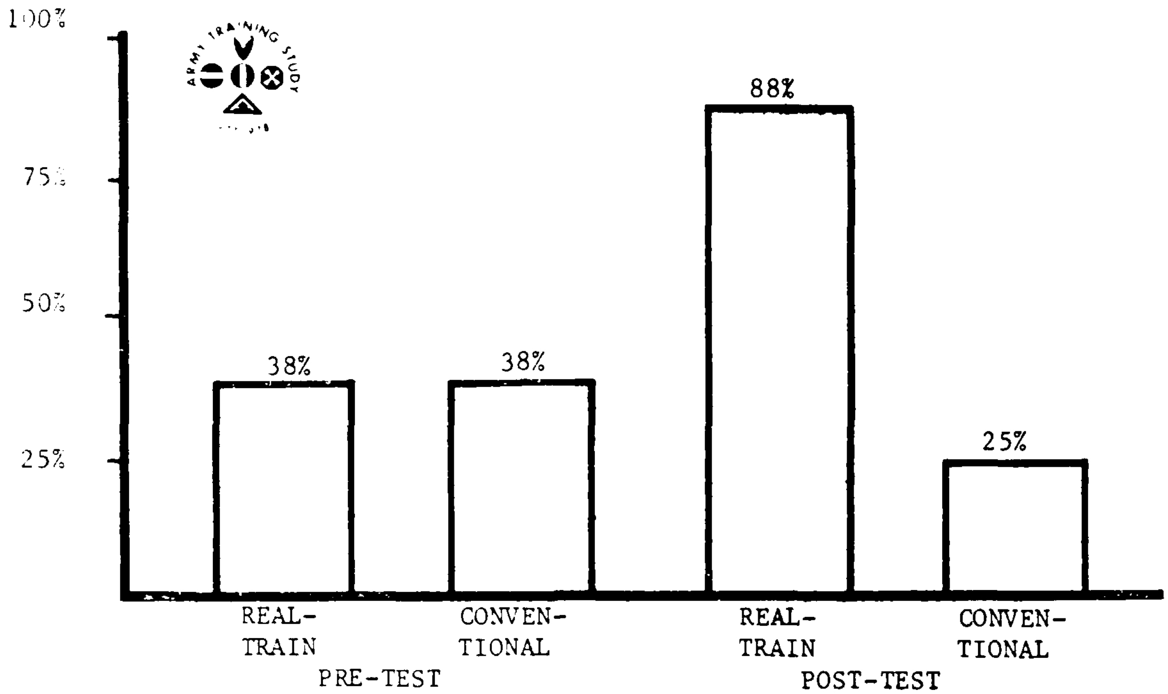


Figure 7. Percentage of Squads Making an Organized Flanking Maneuver at the OP (QL3)

3. Summary of ARTS findings. Analysis of the data contained in the tactical reports reveals the following:

(a) These research results support the findings of the Tank Crew Turbulence Test wherein the conduct of intersive training, narrowly focused on precise tasks, conditions, and standards, results in an increase of individual and collective proficiency in relatively short periods. Analysis of pre and post-training test casualty comparisons confirms the progress of the REALTRAIN trained squads. It is important to note that the conventionally trained squads also suffered fewer casualties after 2 weeks of training even though they were opposed by an enemy at that time who was much more proficient than during the pre-training test. (QL4)

(b) Casualties sustained by all squads during the pre-training test are a measure of the low level of collective proficiency existing in units today. (QL4)

Computer Assisted Map Maneuver (CAMMS)

a. Status of test. This test was completed during the period February to June 1978. The draft test report is currently being staffed through appropriate agencies at the Combined Arms Center (CAC), Ft. Leavenworth, KS, for publication.

b. Responsible agencies. The test was initiated and sponsored by Director, Army Training Study (ARTS), Ft. Belvoir, VA, and Commander, Combined Arms Center, Ft. Leavenworth, KS.

c. Test synopsis. Tests were conducted using five battalion command groups (two Mechanized Infantry and three Armor). The battalions were drawn from four brigades from two CONUS divisions.

1. Objectives. This test adressed three objectives. The first objective was to determine the training effectiveness of CAMMS by a determination of the performance improvement that could be derived from a computerized battle simulation. The second objective was to refine and improve the procedures used to measure the proficiency level of battalion command groups. The last objective was to determine the feasibility of continuing to use CAMMS to investigate command-group training.

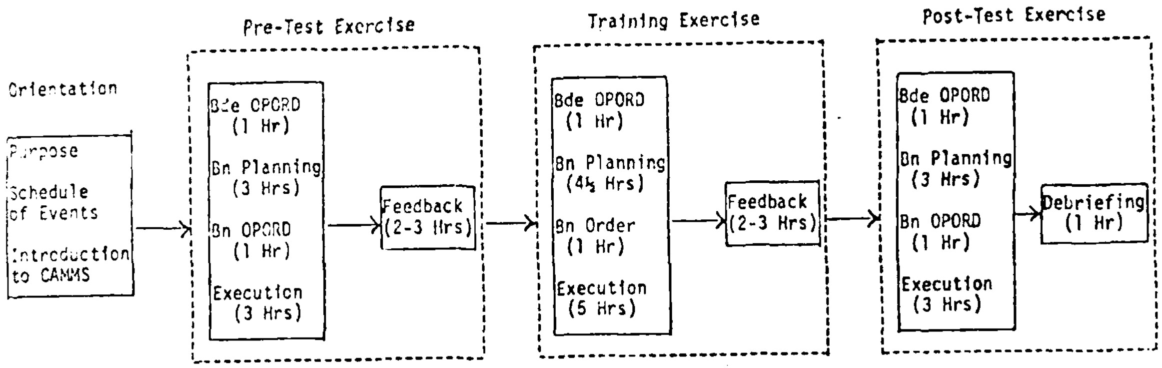


Figure 1. Experimental Objective

2. Test design.

(a) A number of different types of performance were measured. The measurements were accomplished through a subjective rating process using a pretest/posttest design. Command groups participated in three separate exercises, all of which were conducted within a common general senario with the same type mission. The specific scenarios and missions were designed and assumed to be of equal difficulty. To correct any difference in difficulty, the missions for pre and posttest exercises were counter-balanced across units. A feedback session, the format and context of which were being pilot-tested in the effort, followed each of the test and training exercises. Ideally, a control group which received only the pre and posttest should have been included to isolate the performance gains resulting from the testing. Additionally, it would have been desirable to use CAMMS only for the training session to avoid spurious relationships resulting from using the same measuring instrument for testing and training. Time and availability of resources precluded fulfilling these two conditions.

(b) The computer subsystem was designed to support training on military and logistics problems, reduce map maneuver preparation time, and provide faster and more accurate computation, and by so doing, provide greater objectivity and precise summarization of the events which occurred in the battle. The software supports the employment of conventional forces and their normal weapons systems. Artillery, air, mortars, helicopters, and admin/log are processed for both friendly forces and OPFOR. Interface with the computer is accomplished through four remote terminals operating through commercial telephone circuits.

d. Description of subtests: none.

e. Sample size. Five battalion command groups, two Mechanized Infantry and three Armor.

f. Summary of results, findings, and conclusions.

1. Summary of agency findings.

(a) CAMMS shows evidence of being an effective training vehicle for improving battalion command group proficiency as subjectively judged by the consistent and positive changes in performance across exercises and through differentiation among ARTEP tasks, subtasks, and elements within exercises. (QL4)

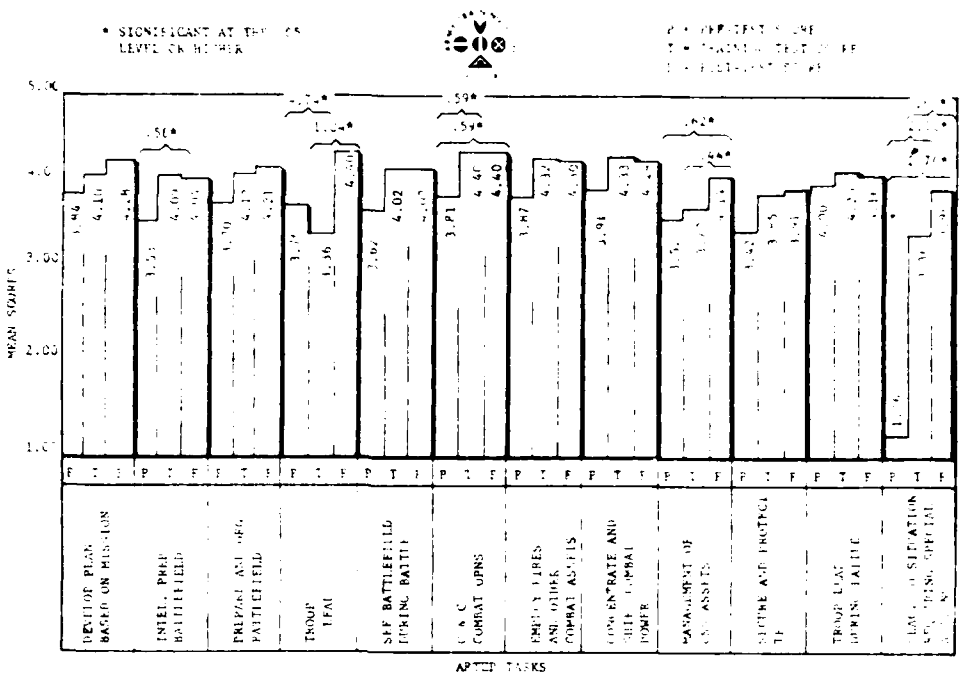


Figure 1. Comparison of ARTEP Tasks for the Pre-Test, Training Test and Post-Test Exercises: Mean Scores, [illegible] (QL4)

(b) The development of a greater number of objective measures of command group performance in CAMMS is feasible to supplement and supplant some of the existing subjective ratings. It will take time and such objective measures should not be expected to completely eliminate subjective ratings. (QL4)

(c) The relationship of command group performance to battalion outcomes is complex and no single measure of performance yet identified can be adequately interpreted in isolation from other measures or from the conditions of the exercise. (QL4)

(d) Performance of some ARTEP subtasks appears to influence battlefield outcomes. Additional effort will be required to determine the influence of other subtasks as well as to determine other useful measures more fully reflecting the total dimensions of battlefield performance. (QL4)

(e) Organizational process measures did not discriminate performance differences among the various measures themselves or change performance as a function of the training exercise, but their outcome measures warrant further investigation. (QL4)

(f) CAMMS has the potential for fulfilling the requirements of a training research vehicle for pursuit of TEA '85 objectives. Some modifications are indicated, but these are relatively modest and generally concern improvements which would occur in the normal CAMMS evolution. (QL4)

2. Summary of ARTS findings. (QL4)

(a) While the small sample size used in the CAMMS TEA testing should be noted, there are useful insights to be drawn from the study. The limited sample size together with the other limitations of the study make this effort a prime candidate for the TEA '79 effort. It would be extremely valuable to incorporate both CAMMS and CATTS in the TEA effort. This would provide separate training and testing vehicles.

(b) The fact that numerical improvement in mean performance did occur between the pretest and the posttest exercises in 46 of the 47 subtasks evaluated, would seem to indicate that improved proficiency did occur. The fact that only 13 of these differences achieved statistical significance at 0.05 level is more likely a function of the small sample than it is the absence of a real difference. This is supported by the consistency in direction of the differences. The same data, when aggregated by tasks, produce consistent findings. Only 3 of the 12 tasks exhibit significant differences but all 12 tasks reflected improvement in mean peformance. A comparison of the differences in mean performance between the pretest and training exercise reveals patterns and magnitudes similar to those between pretest and posttest, but this does not hold true between the training session and posttest session where much smaller differences occur. This apparent reduction in learning rate is suggestive of the commonly hypothesized curve.

(c) In looking at the results of analysis of specific ARTEP tasks, (QL4) the areas that consistently presented the most problems were intelligence, fire support, and admin/log. These findings closely parallel the informal observations of the CAMMS research team and also correspond to research on battalion command group ARTEP performance previously examined in CATTS exercises.

(d) In the comparison of CAMMS battlefield outcomes with various (QL4) ARTEP subtasks, the program seems to be valid. For example, in the correlation of location of the enemy thrust with selected ARTEP subtasks, four negative correlations were obtained (Table 7, p. 51):

(1)	Determine priority of fire	-0.91
(2)	Determine fire support required.	-0.85
(3)	Conduct inital FSC.	-0.91
(4)	Commo/Coord plans and orders.	0.90
(5)	Integrate CSS into selected maneuver.	-0.85

This is understandable. As the error in location of the enemy thrust grows smaller, performance on the fire support subtasks should improve as well as integration of the admin/log effort into the scheme of maneuver. This is no explanation for the positive correlation on Commo/Coord plans and orders unless it is due to the small sample size.

(e) On the basis of this test, CAMMS appears to possess most of the characteristics associated with a good training simulation. (QL4)

(f) There is little evidence to indicate that CAMMS fails to provide sufficient realism to effectively teach staff coordination. In fact, a recent survey by ARI, (Ira T. Kaplan and Herbert F. Barber, "Evaluation of a Computer-Assisted Battle Simulation: CAMMS vs a CPX," undated), rated CAMMS superior to CPX. (QL4)

(g) Improvements in the command group ARTEP should be continued. These should provide more intensive admin/log fire support and intelligence play. Tasks, conditions, and standards should be rewritten and reworded to be more specific. (QL4)

(h) The observation, offered by the CAMMS research team, that command group performance is more that the sum of the performance of ARTEP missions and subtasks, is a basic tenent of ARTS. Tactical readiness (TACR) is the ability of a commander and his staff to integrate the complex battlefield systems, mastery of which is required for success on the mobern battlefield. (QL4)

(i) Information concerning the impact of time assigned to the staff, and experience and/or schooling for that particular staff position, are being analyzed at Ft. Leavenworth and will be forwarded as soon as available. (QL4)

(j) Additional subjects which should be studied in the future development of CAMMS are: (QL4)

(1) Exercise duration.

(2) Number of successive exercises.

(3) Interval between exercises.

(4) Interspersion with other types of individual and collective training.

Training Instrumentation Evaluation (TIE Test)

Transferred to TEA 79 Effort

Final Report due 15 December 1978.

ARI Cannon Crew Turnover Test

Transferred to TEA 79 Effort

Final Report due: TBD

TACFIRE OT III

Transferred to TEA'79

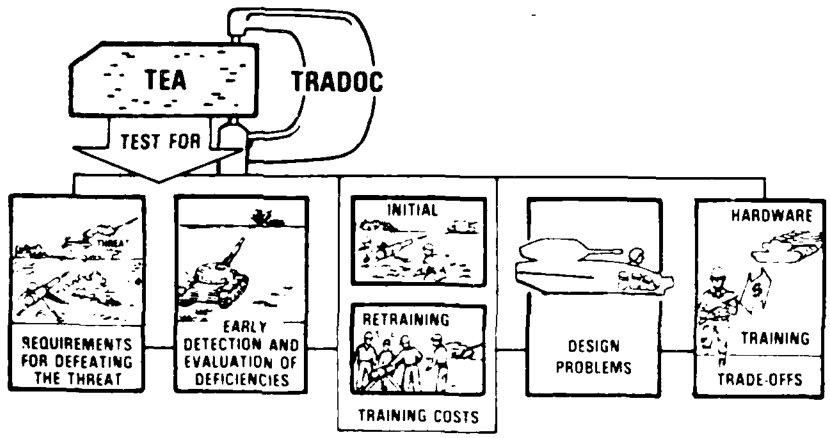
DATE OF REPORT: TBD

ARI Retention and Proficiency Tests and Common Skills

Transferred to TEA 79 Program

Final Report due: TBD

OBJECTIVES OF TEA 85 PROGRAM



OBJECTIVES OF TEA 85 PROGRAM

The long term objective of the TEA '85 program is to ensure total integration of training, logistics, and personnel subsystems with hardware development. This objective is best accomplished by precisely defining requirements to defeat the threat; early detection and evaluation of hardware and training deficiencies; and determining the costs to train and sustain user proficiency. This data is necessary to discriminate training from design problems to allow trade-offs between equipment and the Army's capability to train the user.

The TEA '85 program seeks to attain long term objectives by use of a phased program that initially gains insights into the trainability for selected developing systems. By progressively refining existing procedures to a more sophisticated methodology, the TEA '85 program becomes the foundation for an effective, efficient and justifiable training system necessary to assimilate new, complex weapons systems. The TEA '85 program provides data necessary to allow the BTM to perform to design potential. To ensure adequate training and support throughout a system's life cycle, developmental programs must also consider such factors as the environment of 1985, and pre- and post- mobilization training requirements.

The TEA '85 effort was initiated subsequent to the development of the ARTS TEA '78 program. Initial ARTS analysis of previous TRADOC actions to develop TEA, identified problems in operational test and evaluation activities. The most important of these problems were determined to be:

a. Performance criteria is often not fully implemented; heavy reliance is often placed on individual experience and subjective assessment.

b. Testers have no standard concept of what to test. Tests are often not focused on the issues which will be of key importance to unit commanders once the new systems are fielded.

c. Test scenarios and participants are often poor representatives of user populations and operational problems.

d. Test designers often make inadequate use of performance analysis techniques and advances in educational technology.

e. An inadequate population of properly trained testers seems to aggrevate the other problem areas.

Members of the ARTS group concluded that it was necessary to develop systematic procedures for the testing of individual and collective performance and decay during the testing and evaluation of developmental systems.

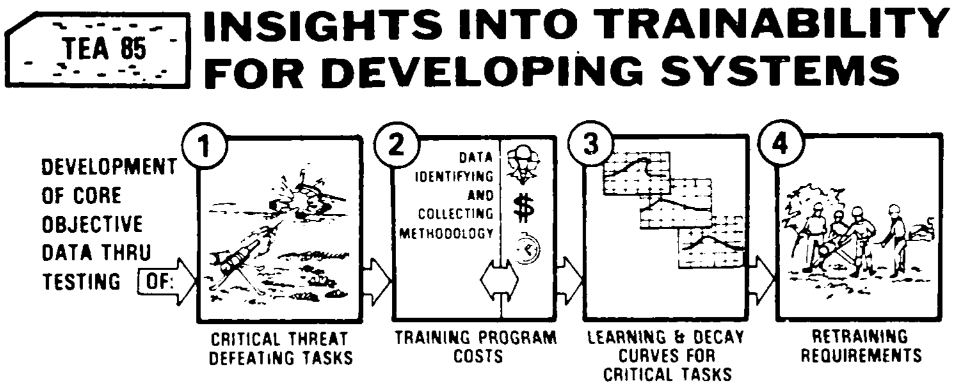
As a structured program, TEA '85 provides an effective tool to aid in establishing an efficient training system for 1985. Together the TEA process and BTM provide the data and training programs required by the ARTS model training system.

Concept

The TEA '85 proposal was driven by the need to exploit knowledge derived from the Army Training Study TEA '78 planning while remaining

within the constrained resources imposed by the planning, programming and budgeting system (PPBS). These resource constraints mandated a phased program which, in the early years would superimpose TEA objectives on scheduled tests being conducted by Army analytical agencies. Required resource levels were modest for FY 1978-1979 as selected tests involved platoon and company sized units. Tests of greater magnitude were scheduled for FY 1980-1981 with planned application of the program to all TEA/OT/DT testing beginning in FY 1982.

INSIGHTS INTO TRAINABILITY FOR DEVELOPING SYSTEMS



Core Objectives

The TEA '85 concept envisioned development of a test methodology to determine specified objectives, referred to as core objectives, for each test. These objectives are designed to determine:

a. Critical SM/ARTEP tasks.

b. Costs (people, dollars, and time) of programs to proficiency.

c. Learning decay.

d. Frequency of retraining required.

Test plans to collect core objective data must be specifically designed so that issues key to the development of suitable training subsystems are examined. Collection plans for core objective data must draw on accurate job performance measures to allow the making of precise trade-off decisions between hardware design and alternative training programs earlier in the developmental cycle before hardware design is frozen.

Consideration of operational problems affecting the ability of a unit to train must also be made if new systems are to be operated at their design capability. The TEA '85 program provides a framework for this investigation. Although problems vary from institution to unit and from unit to unit, these problems must be studied and resolved to ensure total system reliability in the field. These type problems are termed situational variables.

Situational Variables

While core objectives apply to all test, situational variables tested will be peculiar to each test. Selection of variables to be investigated should be the result of predicted variations from the norm in the training environment.

The ultimate users of developing systems are units in the field. These units must operate under conditions shaped by variations in logistical support, personnel status, and training resources. Answers to questions posed by these differing conditions are necessary to accurately forcast life cycle system costs. Successful determination of the impact of introducing new equipment into the Army and of the resultant changes necessary in the Army training system, is largely dependent on this type testing. A list of the most common variables has been compiled by the study group. While the following list is not all inclusive, it covers those areas which most frequently exist and which detract most severely from individual and unit proficiency. Detailed definitions are at Appendix 1.

Common Situational Variables

a. Allocation of taining tasks between institution and the unit.

b. Validation of critical tasks for service school development of how to train to combat proficiency at least cost in a unit.

c. Determine impact of transfer of all or portions of AIT/BT to FORSCOM.

d. Determine effect of expanded OSUT for selected high priority weapons.

e. Develop exportable job training packages to support training in units.

f. Develop training packages to ensure supervisor competence.

g. Determine MOS transition training requirements.

h. Determine resources required to attain unit collective proficiency.

i. Determine effects of personnel stability/instability on proficiency.

j. Determine effects of reduced officer/NCO fill on training.

k. Determine effects of introducing less capable personnel into the training base and units.

l. Evaluate rapid refresher training programs for Reserve Component units.

m. Develop training concepts to train with reduced resources.

n. Develop replacement upgrade training programs.

o. Determine training to exploit enhanced capabilities of modernized equipment.

p. Determine optimal use of equipment pools to support AC/RC unit training.

q. Develop training programs to assimilate new equipment in units.

r. Validate effectiveness and efficiency of training devices.

s. Develop training programs to conduct continous combat.

TEA '85 Model

Because the ARTS TEA methodology is broader in scope and more comprehensive in detail than current TEA, implementation must be evolutionary to ensure precise development of testing methodology and proponent capability. A prototype methodology has emerged. Additional research, however, is necessary for precise methodological development. TEA '85 was designed to further this development as well as to provide key elements of specific information as a necessary follow-on to TEA '78. In addition, ARTS has

initiated construction of a job aid for developmental testers in coordination with the XM1 OT II.

This latter effort combines the talents of the USSARMC, ARI Fort Knox Field Office, the XM1 TRADOC Systems Manager (TSM), and an educational technology contractor, during XM1 OT II. The Armor Center (USAARMC), will exercise overall TRADOC staff supervision of this effort. The TEA model emerging from these efforts should be consistent with the instructional systems development (ISD) model set forth in TRADOC Pam 350-30. The conduct of TEA, however, would be broadened in accordance with the following model to develop a means to link performance deficiencies to all causative factors.

a. Front End Analysis

1) Derive task list

2) Describe target population to include motivation

3) Describe training environment

b. Design/Development Phase

1) Derive objectives

2) Derive criterion tests

3) Prepare training packages

c. TEA Testing Phase

1) Conduct the training

2) Data collection

a) Skills and knowledge

b) Environmental considerations such as instability, low present-for-training strength, shortage of officer/NCOs, less capable soldiers, leader behavior and knowledge, and equipment design.

c) Motivational incentives such as pay, leadership, promotion, and ergometrics.

3) Actual performance

a) Skills and knowledges

b) Environmental factors

c) Motivational factors

4) Deficiencies

a) Individual tasks

b) Collective tasks

c) Command group tasks

d. Evaluation Phase (analyze performance discrepancies)

1) Course of instruction (COI) content; did we lose performance in application?

2) Did training cause immediate learning? If not, why not? (Environment?, Motivation?, COI).

3) What is the transfer to job performance? If not transferred to job, why not? (Learning decay?, COI?).

4) Worth = value/cost. This is essentially the resource input converted to job performance output.

e. Revision

1) Change COI.

2) Change environment.

3) Change motivation.

f. Rear End-Analysis

1) Diagnostic.

2) Environment.

3) Motivation.

4) Critical Task Redefinition.

5) COI.

The first iteration of testing is based on existing factors, i.e., target population and conditions existing in units. Subsequent excursions test appropriate situational variables to obtain decision-making data, and to provide updated information to the BTM data base current with introduction of the weapon/equipment. Full development of this model will begin in conjunction with the XM1 OT II program.

Initial systems scheduled by TRADOC for future TEA during FY 79 and 80 include the following:

System:	AHAMS	IFV/CFV	DIVAD	Firefinder
Proponent:	INF	INF	ADA	FA

System:	AAH	UET
Proponent:	AVN	ENGINEER

The TRADOC FY 1979/1980 command operating budget estimate (COBE) resource computation summary to support the initial testing is as follows:

a. FY 1979:

(1) Methodology development, 300K.

(2) Test support to test agencies, 1000K.

(3) Training subsystem front-end analysis and evaluation (3MY/system X6 system = 18 MY).

(4) Travel, 24K.

Total: 18 MY $1659K

b. FY 1980

(1) Test support to test agencies, 200K.

(2) Training subsystem front-end analysis and evaluation (3 MY/system = 18 MY).

(3) Travel, 24K.

Total: 18 MY $2359K

SUMMARY OF TEA '85 CONCEPTS

The ultimate purpose of TEA in the future should be the realization of efforts in TEA '78-'85 leading to integration of training requirements into the total system development cycle. The investigation of human performance data is necessary to ensure the timely and effective assimilation of trainable systems into units in the field. ARTS TEA concepts have evolved from studies, tests and surveys. These concepts are designed to ensure integration of logistics, hardware, training resources and job performance requirements throughout the development cycle. TEA '78 results indicate that required job performance cannot be reliably attained and maintained unless equipment, job performance aids, training programs and documentation match the type soldier projected to be us the weapon system or equipment as operators and leaders. Further, aspects of the significant variations in unit operating environments have been found to degrade job performance. This mandates that human performance factors should be evaluated under differing conditions. These conditions include variations in the capability of troops, shortage of officer NCO trainers, various types and levels of personnel instability, and equipment or training resource shortages. All of these conditions have been found to be present in units to some degree. Conditions such as these result in the lowering of individual and collective proficiency below acceptable standards.

Future TEA must ensure that factual evidence regarding system trainability is collected early in the developmental cycle. Performance requirements analysis must be initiated as early as OT I to ensure that:

a. Training and human factors are examined during concept formulation to permit user performance goals to be coordinated with the projected Army capability to man the equipment. This will require that research be done sufficiently early in the system life cycle to permit reasonable hardware/training trade-offs. The ability to make these trade-offs early and with a high degree of confidence is essential to the attainment of performance goals at minimal development and lifetime operating and support costs.

b. Human factors testing methodology is improved to permit the separate identification of hardware deficiencies and personnel and training or training support deficiencies.

Proposed TEA '85 Test Program for FY 1980-1981

The FY 1980-1981 TEA program should continue efforts made in FY 1979-1980 to broaden the ARTS TEA methodology to developing systems. A recommended program leading to full application to test and evaluation activities conducted in FY 1982 and beyond is listed below:

System	Dates	System	Dates
Patriot OT II	Jul - Oct 1979	National Training Center	May 1981
AN/TPQ37 OT II	Feb 1980	CAMMS Follow-on	
XM1 OT III	Jun - Dec 1980	Reserve Component Modular Training - Combined Arms - ENGR Bn - CSS Bn - TAC_R	Jun 1981
SINCGARS OT I	Jan - Apr 1981		
Combined Arms Bn Level Simulation (MILES)	TBD		

FY 1982-1985

Beginning in FY 1982, all new equipment should be tested under the Training Effectiveness Analysis program.

Appendix 1 to Annex B
Core Objectives and Situational Variables

CORE OBJECTIVES

A. CONTINUE VALIDATION OF THREAT ORIENTED CRITICAL SM/ARTEP TASKS, CONDITIONS, STANDARDS.

CHALLENGE: Continuation of critical task identification through documented front-end analysis for weapons/equipments and units/jobs is an essential part of the Army Training System.

CONCEPT: Training analysis will continue to form the basis for training development decisions. Modification to training analysis methodology will be limited to that necessary to ensure continuity with situational variables and other core objectives.

B. DETERMINE TIME/COSTS TO ACHIEVE OPTIMAL PROFICIENCY FOR CRITICAL INDIVIDUAL/COLLECTIVE TASKS.

CHALLENGE: To justify training resource requirements, it is necessary to quantify costs attributable to attaining optimal proficiency. Once these costs are established, resources to support training requirements/missions allocation and reallocation between the training base and units in the field can be made rapidly and accurately.

CONCEPT: The ARTS developed training resource methodology will become a part of training development methodology.

C. CONTINUE TO DEVELOP DIAGNOSTIC TESTS TO MEASURE INDIVIDUAL/COLLECTIVE LEARNING DECAY LEVELS.

CHALLENGE: Individual/collective learning decay rates must be determined for each weapon and equipment system/unit/job in order to quantify existing proficiency levels and to fund requirements to obtain optimal proficiency.

CONCEPT: Training analysis during testing is to be designed to measure skill acquisition and learning decay over time by use of diagnostics and retraining time. Development of diagnostic testing is critical to success as retraining requirements must be based on the Delta between proficiency attained at completion of training and subsequent residual proficiency. In other words, only that which has been lost is retrained, not that which has been retained.

D. DETERMINE FREQUENCY OF RETRAINING REQUIRED TO SUSTAIN OPTIMAL PROFICIENCY FOR INDIVIDUAL/COLLECTIVE TASKS (TIME/COSTS).

CHALLENGE AND CONCEPT: See Objective C above.

CORE OBJECTIVES

EEA

A. Continue validation of threat oriented critical SM/ARTEP tasks, conditions, standards.

(1) Are SM tasks/ARTEP events based on the documented results of appropriated front-end analysis techniques?

(2) Are ARTEP events supported with prerequisite SM tasks?

(3) Was performance of SM/ARTEP tasks actually necessary for the accomplishment of a specific mission (i.e., Was it truly a critical task?)?

(4) Is the specific level of proficiency greater than, equal to, or less than that required to meet the threat?

B. Determine time/costs to achieve optimal proficiency for critical individual/collective tasks.

(1) What resources are required in the institution?

(a) Dollars
(b) People
(c) Time
(d) Dollars and people
(e) Dollars and time
(f) People and time
(g) Dollars, people, and time

(2) What resources are required in the unit?

(a) Dollars
(b) People
(c) Time
(d) Dollars and people
(e) Dollars and time
(f) People and time
(g) Dollars, people, and time

(3) Does the collected data reflect deviation from real-world normalcy, i.e., validity of trainee/instructor, NCO/officer fill, unusual environmental constraints or advantages?

C. Continue to develop diagnostic tests to measure individual/collective learning decay levels.

(1) Do current tests account for learning/decay which occurs subsequent to course/period of instruction?

(2) Does the diagnostic test program provide for testing at two or more data points? (i.e., 30, 60, & 180 days after training).

(3) Do diagnostic tests provide data to determine specific skill/proficiency loss and retraining to proficiency required (i.e., make the corrective action obvious)?

(4) What is the training resource requirement to reacquire mastery after various intervals subsequent to the original training program? (Note: All training activity, or lack thereof, must be considered.)

D. Determine decay rates and frequency of retraining required to sustain optimal proficiency for individual/collective critical tasks (time costs).

(1) What is the time to initially learn a skill to mastery?

(2) After specified intervals without practice, what is the time required to relearn a skill to mastery?

(3) Within task performance, which elements are forgotten first?

(4) What is the frequency of retraining or practice necessary to ensure retention of acceptable levels of proficiency?

SITUATIONAL VARIABLES

1. Reduce length of selected courses for high density/low technology MOSs vs. low density/high technology MOSs.

2. Resources/effect of training common versus technical skills only in institution.

No longer used in TEA.

3. Allocation of training tasks between institution/unit.

CHALLENGE: Resources required to train to proficiency in collective/individual tasks vary as a function of the type task. Acceptable levels of decay in proficiency vary with the missions assigned to the unit. It is necessary to identify required resources, rates of decay for critical tasks, and retraining frequencies. Such determination will form the basis for allocation of training resources.

CONCEPT: Data should be extracted, as available, from tests as to time and training methods to train to individual proficiency. Post training diagnostic tests administered to determine proficiency decay of critical skills over time can be one indicator of what training is best conducted in the unit or institution. Skills with lengthy retention, best taught with sophisticated training aids, are best taught in the training base. Conversely, skills of short retention with hands-on practice required to maintain proficiency, are best taught in the unit. This determination will be a function of the degree of simulator/instructor intensive support required and the rate of past training decay. (See TRADOC Pamphlet 350-30).

4. Validation of selected critical tasks for service school development of how to train to combat proficiency at least cost in a unit.

CHALLENGE: Commanders need advice concerning how to use their limited resources to train to combat proficiency. Critical tasks, both individual and collective, once threat validated, must be selected, aggregated, then with the addition of conditions and standards formulated into battle drills so that the unit commander can utilize the principle of integrated training to train to combat proficiency at the least cost. Such a program of battle drills needs to be tested.

CONCEPT: Critical tasks should be selected and validated. They should then be aggregated in a logical fashion and shaped into battle drills. Tests should be developed to measure the changes in proficiency as well as costs involved in this type of training. Data drawn from these tests can be compared to the baseline, that data obtained from testing using the commander's previous training program.

5. Determine impact of transfer of all or portions of AIT/BT to FORSCOM.

CHALLENGE: To determine a cost efficient policy for training entry level soldiers to proficiency in common and MOS-related skills. The feasibility of providing only basic training for selected skills in the training base needs to be tested.

CONCEPT: The test would be conducted by providing to units replacement personnel in selected MOS who have completed only common skills basic training. The unit would be required to train all such personnel to proficiency in MOS-related skills without increase in current ALO. TRADOC schools would provide the training packages and MTT's to ensure supervisor competence as required. Training within the unit should be conducted on a schedule as desired by the commander, excepting that proficiency required be established by the proponent school. Evaluation of comparative costs and the effects of this additional training load on unit readiness will be determined by comparison to OSUT costs/proficiency with a baseline unit by test agency evaluation of resultant individual and unit proficiency.

6. Impact of transfer of BT to FORSCOM

7. Impact of transferring all entry level training to FORSCOM

8. Impact of transfer of all except critical task training to FORSCOM

9. Impact of transfer of all except high-technology task training to FORSCOM

10. Effect of expanded BT to develop cross-training in support MOS

No longer used in TEA.

11. Determine effect of expanded OSUT for selected high-priority weapons

CHALLENGE: To determine a cost policy for training selected entry level soldiers in common and high priority weapon system skills. The effect on unit training and costs of providing training to maximum proficiency on critical tasks in the training base needs to be tested.

CONCEPT: The test would be executed over an extended period by conducting entry level training to varying levels of proficiency by expanding selected OSUT. Testing will involve control and test groups. Postgraduation testing to determine learning decay/retraining rates between test and control groups will provide data needed to design training programs. These programs provide a basis for timely resource distribution to ensure enhanced individual skill proficiency and retention for high priority weapons systems.

12. Develop exportable job training packages required to support training in units

CHALLENGE: To rapidly train, sustain, or retrain soldiers/units in skills when the situation does not permit conventional training or when the skill can be more adequately taught by use of training packages.

CONCEPT: The concept is to prioritize skills which are critical and then teach these skills in a intensively structured series of individual/collective training periods. Maximum use of training packages will be made. Testing will center on comparative analysis of costs and proficiency attained over time against a baseline of similar proficiency levels attained through conventional training. Consider the following in sequence:

a. Job performance aids

b. Self-teaching, exportable packages

c. Formal/supervised OJT programs

d. Installation (shadow) or unit schools

13. Develop training packages to ensure supervisor competence

CHALLENGE: Trainers must be taught efficient and effective methods of training.

CONCEPT: Packages will be developed for use by mobile training teams from appropriate service schools. Various training packages will be devised and tested. Test data will be used to prepare packages which will permit mobil training teams to train supervisors to competence in the field. Packages, as well as the mobile training team concept, will be evaluated.

14. Determine MOS transition training requirements

CHALLENGE: To rapidly train soldiers to the 10-30 skill level on specific weapons and equipment. This is an integral part of new equipment assimilation training for both Active and Reserve Components. In addition, MOS imbalance must be readdressed and precombat refresher training must be accomplished by MOS transition training.

CONCEPT: Critical skills, by system, must be put in priority. Only cirtical skills will be taught. Testing will measure proficiency attained in a new critical skills and retention of less critical common skills. Data will enable planners to quantify resource requirements and to design job-oriented training programs and job-training packages. This testing is suitable for both Active and Reserve Component units during premobilization and postmobilization.

15. Determine resources required to attain unit collective proficiency

CHALLENGE: It is necessary to determine the resources required to attain and maintain collective/individual proficiency for specific critical tasks, conditions, and standards in order to establish and then justify required resources for training time (men, equipment, time, POL, ammunition, simulators, etc.).

CONCEPT: Resources required to train units to proficiency will be determined during testing. Data will be extracted which will allow determination of the resources necessary for a type unit to attain required standards of proficiency in critical tasks under specific conditions.

16. Determine effects of personnel stability/instability on proficiency

CHALLENGE: Lack of personnel stability results in lengthened training/retraining time to achieve collective proficiency in critical task skills as well as accelerated decay of collective proficiency.

CONCEPT: Testing the effects of instability and stability envisions introducing controlled instability or quantifying existing instability in the training environment (within crews and within companies) and then measuring the proficiency change in contrast to the proficiency of more stabilized crews/units. This should permit determination of the increased resources and time necessary to attain and maintain individual/collective proficiency when there is high personnel instability by determining the increased frequency required to maintain a desired level of proficiency. Consider also:

a. Effects on unit training programs (continuity)

b. Effects on development of leadership

c. Attitudes on training such that retraining frequency is changed

17. Determine effects of reduced officer/NCO fill on training

CHALLENGE: A low percentage of officer/NCO fill interacts with other unit training distractors (turbulence, troop diversions, authorized absences, etc.) to degrade training effectiveness and proficiency.

CONCEPT: Testing the training effects of various levels of officer/NCO fill is required. Data will be extracted to enable determination of the resources required at different levels of officer/NCO fill to attain individual/collective critical task proficiency and to establish the type and frequency of retraining necessary to maintain that proficiency.

18. Determine effects of introducing less capable personnel into the training base and units

CHALLENGE: The Stragegic Studies Institute study, "Army Environment, 1985-1995," predicts that the typical incoming soldier of 1985 will be less capable of mastering complex training than his comparable peer today.

CONCEPT: Testing the effects of less capable trainees envisions that special attention be paid under controlled conditions, to determine the problems, if any, which result. Testers should identify less capable personnel participating in test activities and seek to determine whether additional resources are needed to bring these soldiers to average proficiency. The effects that application of these additional resources have on other trainees and unit training programs should also be quantified. A range of solutions applicable to a specific set of tasks, conditions, and standards should be obtained. Data will be extracted to assist in determination of personnel selection criteria.

19. Evaluate rapid refresher training programs for Reserve Component units

CHALLENGE: Reserve Component units must be rapidly trained up with refresher training to peak critical task skills prior to deployment (Pre and post M-day).

CONCEPT: Train-up packages for critical systems and units must be designed, fielded, and validated for Reserve Component units. Packages should be designed such that training can be accomplished by RC trainers. These trainers must produce units trained to combat proficiency in the shortest time, both premobilization and postmobilization. After the packages have been validated at company level, battalion level packages will be developed. In addition, further packages should be devised to rapidly train up troops who, after deployment, are issued new and different equipment. Training packages (modular training) will be administered to RC units. Post-training proficiency will be measured against baseline units trained under existing RC programs. Costs to proficiency and levels of proficiency will be compared to validate training modules and to provide necessry feedback to modify modules as necessary.

26. Develop training concepts to train with reduced resources

CHALLENGE: Training systems must be devised to enable the institution and units to train to proficiency with decremented resources.

CONCEPT: Training program for testing will be analyzed to identify use of advanced or innovative training techniques which result in a degree of proficiency at reduced resources. The effectiveness of these innovative programs should be validated during testing and reports prepared which document fully the resources, training events, and level of proficiency attained. Where possible, decay rates for proficiency thus obtained should be determined and compared to conventional training decay.

21. Develop replacement upgrade training programs

CHALLENGE: The high-low mix of major equipment items mandates that replacement soldiers will need rapid transition training on the type of equipment they will be using in combat. The need for replacement training upgrade will be found in areas close to the scene of combat where training time will be severely limited.

CONCEPT: Packages will be designed to rapidly train replacements to proficiency in the use of various weapons and other items of equipment. Once devised, packages will be evaluated through field testing and revised as necessary. Tests will be run on selected equipment. Once the concept is validated, packages will be developed for other combat critical equipment.

12. Determine training to exploit enhanced capabilities of modernized equipment

CHALLENGE: The Army is purchasing enhanced capability in the form of armor, speed, maneuverability, fire power, and target acquisition capabilities in its modernizaion program. The training system for 1985 must provide individual/collective skills to ensure the exploitation of this enhanced capability.

CONCEPT: Testing will entail a broad, comprehensive evaluation of the programs, techniques, and technology available to train commanders, staffs, units, and individuals in the critical skills required. Data will be extracted to enable design and support of a training system to impart requisite skills on a train and retrain basis to ensure maintenance of proficiency. For example, the speed, increased armor protection, target acquisition, and kill capabilities of the XM1 pose major individual/collective training challenges which must be satisfied to realize the potential of this weapon system. Similarly, the repair of combat damage to this type system must be trained.

23. Determine optimal use of equipment pools to support AC/RC unit training

CHALLENGE: With a significant portion of the Army's equipment positioned abroad, there is insufficient equipment to fully equip AC and RC units. Those units which are short equipment must be provided a validated training methodology to ensure maintenance of individual and collective proficiency.

CONCEPT: One solution to this problem is the use of equipment pools. This technique will be evaluated through testing in conjunction with other battalion-sized field tests. Data yielded will be used to determine the advantages and disadvantages as well as the costs involved.

24. Develop training programs to assimilate new equipment in units

CHALLENGE: Training developments for major systems occur within the context of the total systems acquisition process. Training subsystems must be designed and tested at each stage of the process. The interaction of the human engineering effort and the cost to train to proficiency must be evaluated and quantified to facilitate design/training trade-offs.

CONCEPT: Tests will be conducted to develop training systems needed. Trained personnel, resources, and technical support will be evaluated to determine their capability to carry out required missions/activities concurrent with, and subsequent to, fielding new equipment. Data extracted from tests will be incorporated in life cycle/system management models.

25. Validate effectiveness and efficiency of training devices

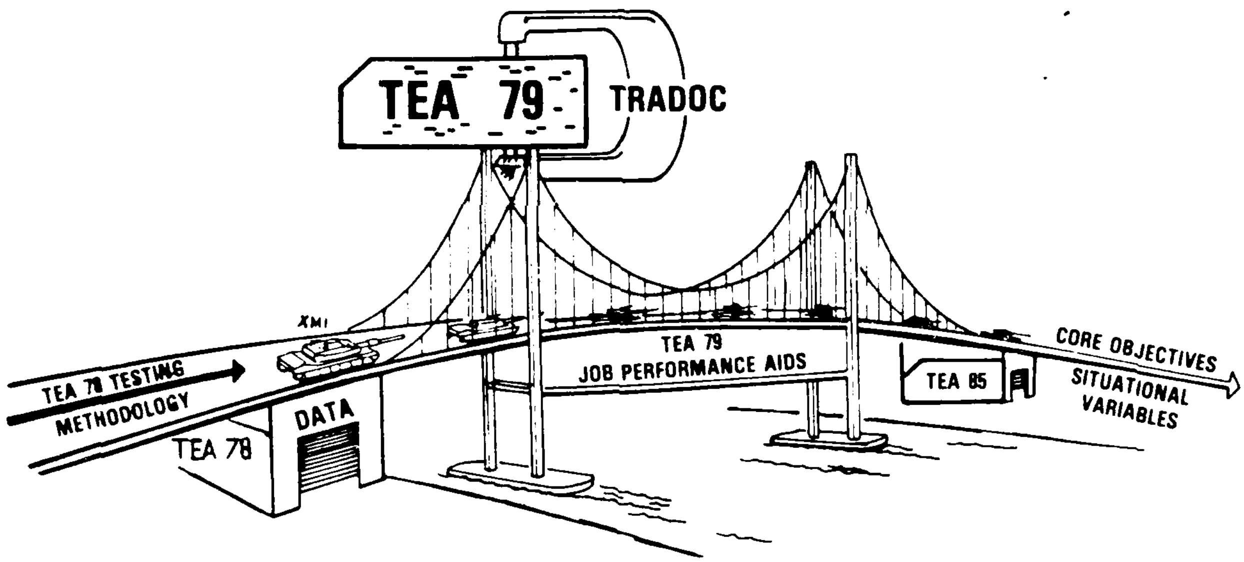
CHALLENGE: Training devices are developed in concert with the major system they are designed to support. Care must be taken to ensure that skills developed on training devices are reliably transferable to the actual system. Further, these skills must be those necessary for development of proficiency.

CONCEPT: Testing will be designed to compare individual/collective performance of actual tasks after training on training devices. A comparison to training conducted exclusively on the real equipment, and in mixes of devices and real equipment, will be made. Costs to proficiency will be compared and use of training devices to reinforce and retrain decayed skills will also be measured.

26. Develop training programs to conduct continuous combat

CHALLENGE: Continuous combat is made possible by equipment systems that enable effective combat and movement at night. This potential, however, cannot be realized without an equivalent capability in every essential element of combat an associated combat support and combat service support areas. Training programs required to achieve this capability are largely unknown.

CONCEPT: Testing will be designed to maximize realization of equipment potential by identifying those critical tasks/skills required to fight continuously. Associated combat service support as well as combat and combat support critical tasks will be identified. This will enable design of training systems to enable the Army of 1985 to attain a continuous combat capability compatible with equipment capability and emerging doctrine.



A detailed analysis of completed TEA '78 results and a review of tests yet to be concluded establish a requirement for additional testing. The TEA '79 test program has been designed by ARTS to fulfill three requirements:

a. The need to finish tests not completed in the TEA '78 program.

b. The need to retain the momentum gained during the conduct of the ARTS Study and to refine survey derived data currently factored into the BTM.

c. The need to continue refinement of the TEA methodology to facilitate transition to future TEA efforts in TEA '85.

TEA '79 Tests

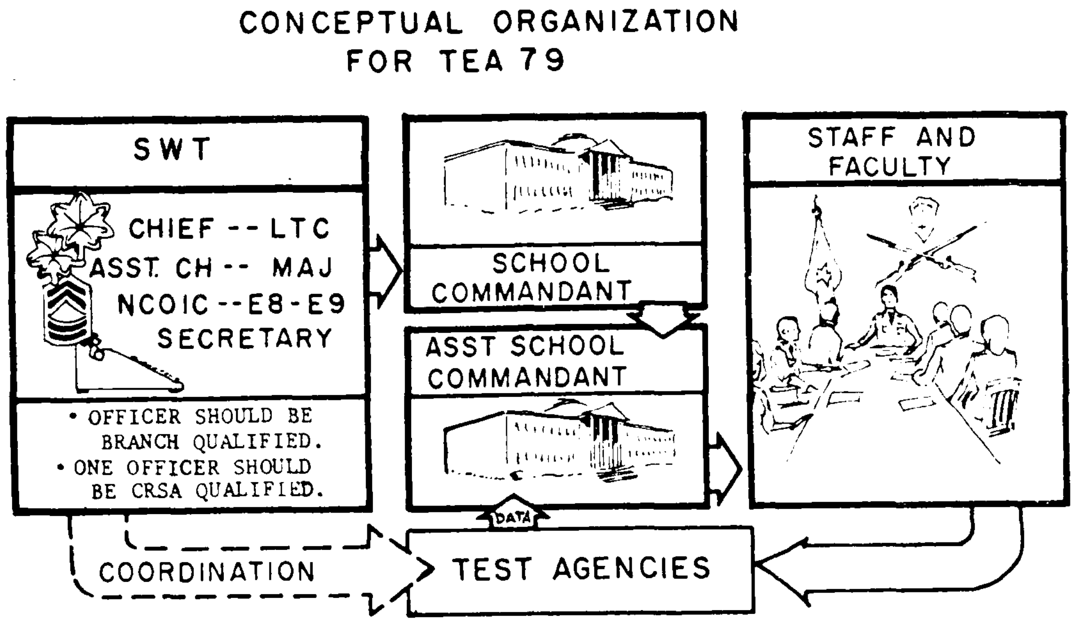
Eleven ongoing studies from TEA '78 have been incorporated in the TEA '79 program. The following eleven studies are ongoing parts of the overall TEA '78 effort and will be completed during the TEA '79 framework. Individual test information is included in Appendix 1, TEA '78 Management System Package to Annex A.

SWT/Test Agency	Test Title	Reported Dated
M60A1	Modular Training for RC	Final 4Q FY 1979
M60A1	Scaled Range Sub Caliber Test	Phase I 30 Aug 1978 Final Est 9 Nov 1978
M60A1	XM1, OT II	Final Est Jan 1979
TOW	TOW TEA Test	TBD
FO	Forward Observer (FO) Unit Training Test	Final 1 Oct 1978
FO	Observed Fire Trainer CTEA Expansion	Final 1 Jan 1979
FO	Suitability of 13F Exportable Training	Final 15 Feb 1979
FO	Tacfire OT III	TBD
CDEC	Training Instrumentation Evaluation (TIE) Test	Final Est 15 Dec 1978
ARI	Cannon Crew Turnover Test	Est 2 Q FY 1979
ARI	Proficiency and Retention of Common AIT Skills	Est 1 Q FY 1979

Note: Core objectives and situational variables for these tests are listed at Appendix 1 to this Annex.

Test initiatives include research into tank crew performance potential through stabilization; follow-on command group training through use of CAMMS and CATTS with eventual verification of proficiency gained on an instrumented battlefield; XM1 OT II; and additional testing of performance decay under more controlled conditions. The program also includes plans to test units trained with the multiechelon, integrated training and battle-drill battalion training programs designed with the aid of the BTM,

by members of the ARTS study group. These new initiatives and other tests will be discussed in detail later in this appendix.



Conceptual Organization for TEA '79

The TEA '78 effort has provided cells of experienced personnel in participating schools and supporting agencies. The experience and momentum from TEA '78 is required to ensure continuity of effort. Experience gained during the ARTS study suggests that a small number of personnel augmented by subject matter experts as required should be assembled for each proponent service school. Typically, this nucleus could be one LTC/GS14, and one MAJ/GS13 (one of whom is ORSA qualified) augmented by one senior NCO and necessary administrative support. As the responsibility for TEA requires coordination across the broad spectrum of service school directorates, the System Work Team (SWT) should be positioned under the school Commandant, a level where such coordination is normally done. Concurrent with the development of an organizational structure, the required funding to include adequate travel funds must be justified.

A phased approach to institutionalization appears appropriate. A recommended approach for FY 1979 is to continue the TEA 78 SWT as presently organized and to establish new SWT as additional schools become involved in testing. In FY 1980 it would appear appropriate, if TEA development has proceeded as planned, to integrate the SWT into the training development directorate (DTD) of appropriate schools and centers.

Concept of TEA '79

Conceptually, TEA '79 should build on the experience gained with actual TEA field testing during TEA '78. It should provide for the continued refinement of TEA methodology designed and proposed as a part of the TEA '85 program. It should also be consistent with the ISD model established by TRADOC Pam 350-30. TEA testing, however, should be broadened in scope to include progressively deeper research into the impact of operational challenges. Further, development of testing methodology to link job performance deficiencies to causative factors and the preparation of a job aid for training development testers initiated in conjunction with XM1 OT II must be continued. Test development should include the six-phase process conceptualized in Annex B—TEA'85. Those phases are:

a. Front End Analysis

b. Design Development Phase

c. TEA Testing Phase

d. Evaluation Phase

e. Revision

f. Rear End Analysis

The first iteration of testing in TEA '78 was largely designed to identify existing training programs, levels of proficiency, and training needs. Second generation testing should be designed to investigate TEA core objectives and situational variables by creating conditions of turbulence, various levels of manning, equipment fill, etc. This concept of testing is necessary to ensure trainability of new systems and to supply the necessary updated information to the BTM data base apace with the introduction of new systems. Full development of this TEA '79 model will begin in conjunction with XM1 OT II.

TEA '79 Tests

The following studies should be initiated in FY '79 to collect essential data necessary tomore precisely define problem causation and to yield data which can be used to develop the means to correct those training problems while at the same time providing data to the ARTS data base for factoring into BTM programming.

a. Title: Tank Crew Stability Research. School/Agency: USAARMC/ARI

Objectives	Sample Size	Data Collection
1) Measure the effect of crew stability upon tank gunnery performance.	2 Armor Bns (108 crews) (1 Bn USAREUR) (1 Bn CONUS)	Tank crew stability questionnaire
2) Measure the effect of TC/Gnr stability as opposed to full crew stability.		Demographic questionnaire tank Table VIII scores
3) Determine training resources to proficiency attributable to stabilized versus nonstabilized units as a function of the probability of hit (Ph).		

Concept: Tank crew stability research is required to establish the baseline potential crew performance in CONUS and USAREUR for M60A1 tank probability of hit (Ph) in comparison to AMSAA data. Tank crew turbulence testing results from TEA '78 revealed a less then required standard of gunnery proficiency. Personnel instability among baseline crews was so similar to crews in which turbulence was induced that the effect of turbulence could not be isolated as the sole causative factor because the performance potential of present gunnery programs had not been established. This was indicated by two test results: first, scrambled crews and crews with non-MOS qualified gunners and loaders fired as proficiently as baseline crews; second, all crews fired below system capabilities established by the AMSAA curve. In order to determine the extent of system performance degradation, it is necessary to attain full crew stabilization through at least two gunnery programs in CONUS and USAREUR (approximately one year) and compare the results of Table VIII (and IX in USAREUR) with two other randomly selected battalions which have experienced normal turnover and turbulence. Analysis of data from the M60A1 WSTEA, the ARTS "Best Battalion" Costing Survey, and the Tank Crew Turbulence Test indicates that only minor changes in the personnel assignment policy at battalion would be required (as reported by the Tank Force Management Group 55 percent of turbulence is generated at the battalion level). What is necessary is to limit battalion and company command

command authority to shift tank crewmen from one position/crew/unit to another for one year. (Core objectives and situational variables are listed at Appendix 1).

b. Title: CAMMS/CATTS Follow-on Test School/Agency: CAC/ARI

Objectives	Sample Size	Data Collection
1) Confirm effectiveness of CAMMS as a training method.	10 Bn command groups (50% AC) (50% RC)	Cmd gp/staff module ARTEP 71-2 Pre-and post-test evaluation
2) Establish methodology to relate unit training proficiency to the type and amount of performance improvement by command group use of CAMMS.		Performance measurement plan. a) CAMMS b) Extend to CATTS
3) Develop an assessment tool external to CAMMS.		

4) Determine effects of stability/instability on collective proficiencies.

Concept: CAMMS testing for TEA '78 research was very beneficial in advancing the state of the art in measuring tactical readiness and in providing preliminary insights into the learning/decay phenomena associated with computer assisted battle simulations. The research, however, was limited by the small sample (five battalion command groups) which could be tested in the available time. Further, research to date has established the need for an assessment tool external to CAMMS. TEA '79 testing should provide that units completing CAMMS exercises also play CATTS so that any special skills unique to the CAMMS vehicle (as opposed to content) can be detected and discounted. Additionally, data are required on the performance of more command groups so that subsequent evaluations of unit performance at the National Training Center (NTC) can be correlated with command group and staff performance on CAMMS and to actual unit proficiency on ARTEP tasks. A longitudinal study is also necessary to determine the effects of turnover/turbulence on proficiency at CAMMS as opposed to field performance at the NTC. (Core objectives and situational variables are listed at Appendix 1).

c. Title: XM1 OT III School/Agency: USAARMC/ARI, OTEA

Concept: TEA '79 interest in XM1 OT III derives fromthe ongoing OT II objectives and test activities scheduled for completion in December 1979. ARTS TEA '78 efforts are oriented toward developmental testing improvements in prototype skills and job performance aids to assist in establishing a more advanced body of professional knowledge for the conduct of future TEA. TEA objectives and data collection plans for XM1 OT III remain as depicted on page A-13 of the TEA '78 Management System package (Appendix 1 to Annex A). Additional methodology development objectives are discussed in the paragraph on the future TEA later in this paper. (Core objectives and situational variables are listed in Appendix 1.)

d. Title: Proficiency and Learning Decay School/Agency: TBD

Objectives	Sample Size	Data Collection
1) Investigate the relations between over-learning, type skills, (cognitive sequential, discriminatory, etc.) type instruction, and demographic variables.	100 basic armor trainees 100 basic infantry trainees 100 basic artillery trainees	Demographical data End of course test scores Subsequent end of test scores over time.
2) Determine resource implications associated with learning decay for Armor and Mech Infantry MOS.		
3) Investigate the operative factors required to validate the ARI model for predicting skill retention by specific tasks.		

Concept: The TEA '78 research into this subject was not of sufficient precision to justify training decisions or action on some very important issues--specifically, proficiency loss by lower mental category personnel. This situation could have serious repercussions on the force in coming years. The reasons for this are: first, these mental categories comprise the majority of new armor accessions (and by implication, infantry and artillery accessions); second, skill retention is least in those very areas upon which leader proficiency is dependent; and third, equipment of the future is likely to be more complex and to require a higher degree of skill retention. In the TEA '78 research, a large number of variables were examined and there will likely be some confounding or interdependence of such variables in an operational environment. For example, unit of assignment was somewhat confounded with time of retention testing. In some units tested, the bulk of examinees were relatively new arrivals to the unit. In other units tested near the end of the study, all examinees had been in the unit for 15 weeks or more. Since there was a significant performance difference among units, this difference was confounded with time between graduation and the retention test, and perhaps affected retention results over time. This problem could have been avoided by sending out several test teams at the same time and by assuring that the OSUT graduates in December 1977 to March 1978 time frame were assigned uniformly to tested units. Resource and practical constraints did not allow such an approach to be taken.

An ideal study of retention of combat skills will be impossible to conduct in the normal operational environment. Learning in the institution will have to be tightly controlled and measured to ascertain that all tasks were learned to the same level by all personnel. Constant, well-trained teams of testors would be necessary for testing in the institution and in the units. Unit training will have to be carefully documented to determine the effects of different approaches. Resource and practical constraints have made such an approach impractical to date. By planning ahead, however, research can start in the right direction by looking at limited, carefully analyzed sets of tasks in controllable situations. By limiting examinees to 100 for each training center, test requirements should be able to be supported by units in the field. The TEA '78 study provides a general picture of armor skill retention; next, perhaps such retention can be more carefully analyzed a small piece at a time.

Several specific future directions for retention research are suggested in TEA '78 results. Critical skills need to be further disintegrated into their components so that specific elements which are C-8

difficult to retain can be identified. This data can validate a model predicting skill retention for various types of skills such as mechanical, procedural, and cognitive. A prototype of such a model has been developed by ARI. Research is needed to further address whether cognitively organized skills are indeed harder to retain, and if so why. Particular emphasis should be placed on lower aptitude personnel. Questions to be answered include: Is the finding related to the organization of skill representation in memory? Are there ways in which these skills can be better organized (e.g., by memory aids) to improve retention? Study should be done on retention using measures more analytical than the simple "Go" or "No Go" criteria. Such work may eventually lead to models accurately predicting skill retention by specific types. Optimal training and retraining programs could then be developed. In addition, since a lower mental category has to date equated with more frequent or lengthy retraining to maintain proficiency, it is very important to determine with precision how much more it costs in terms of people, dollars, and time to train, retrain and, thus, to retain lower mental category personnel in a combat MOS. Specific answers to these questions are necessary to determine cost-benefits attendant to allocation of resources to attract and maintain personnel with higher mental qualifications versus resources for more frequent and more costly training. Such data will be needed in the future to replace survey derived data now factored into the BTM. (Core objectives and situational variables are listed at Appendix 1.)

e. Title: Battalion Training Model (BTM) Training/Battle Drill

Training Program Test. School/Agency: TBD

Objectives	Sample Size	Data Collection
1) Detemine the relationships between training as currently conducted and multi-echelon integrated training conducted using the BTM training program and tested levels of proficiency.	4 AR Bn 4 IN (M) Bn	Demographic data SM/ARTEP type test results Gunnery results Training program and and resource data

Objectives	Sample Size	Data Collection
2) Determine the training resources (people, dollars, time) required by the training alternatives of conventional training and the BTM training program.		
3) Validate the training and battle drill formulations and their associated training packets.		

Concept: A mechanized infantry battalion training program based upon multiechelon integrated training was formulated and presented with the initial BTM Report. An armor battalion program will be developed next. These programs should be tested at the earliest opportunity. Following a train-up program on how to plan and conduct training in accordance with the ARTS developed concepts, selected test battalions should conduct training according to the BTM training program. During this training, units would use the appropriate training and battle drill formulations and training support packets. The results of the training of the test battalions could then be compared to the training results of the conventional training programs of the control battalions.

f. Title: 63C/H Follow-on Test School: USAOCCS

Objectives	Sample Size	Data Collection
1) Determine the optimun spectrum of tasks for MOS 63C/H.	TBD	TBD
2) Measure 63C/H supervisor capability.		
3) Determine a workable method to use the proficiency of the training base to raise the proficiency in the field of mechanics and supervisors.		

Concept: TEA '79 interest in MOS 63C/H derives from the findings in TEA '78 that proficiency in the field was low and that no systematic on-the-job training (OJT) programs for maintenance personnel were observed in the units visited. TEA '78 testing was designed to determine proficiency development profiles for 63C, track vehicle mechanics and 63H, tank automotive repairmen as a function of MOS, aptitude scores and rank. Soldiers tested were assigned to CONUS and USAREUR based active Army divisions and one National Guard division. Data were collected using both hands-on examinations and questionnaires. Data coded and placed in a computerized data base. Test results also indicated that proficiency developed during AIT decays very rapidly if not reinforced on the job at an appropriate interval. The lack of a systematic OJT program could have serious ramifications should the Army encounter conditions of changing support requirements or supply disruptions such as would result if the nation went to war. In that event, the policies often resorted to by commanders, such as over specialization of personnel and heavy reliance on replacement rather than repair, would have to be modified with an accompanying decline in equipment availability. TEA '79 efforts should focus on resolving the problems described in TEA '78. At least until effective field sustainment training programs are established, the concept of training and development of maintenance personnel on a broad spectrum MOS as opposed to specific job or duty position requirements should be examined. A test should be done to determine the best way to use the proficiency of the training base to raise the proficiency in the field--possible solutions which might be explored include: the use of job aids and/or TEC and the use of a USAOCCS prepared training package. Consideration should be given to training both supervisors and subordinates. If the unsatisfactory level of supervisor competence revealed in TEA '78 is determined to be wide-spread, the USAOCCS should consider establishing immediate programs to alleviate the situation. (Core objectives and situational variables listed at Appendix 1.)

Appendix 1 - Core Objective & Situational Variables for TEA '79

SWT	Test Title	Core Objectives & Situational Variables[1]
M60A1	M60A1 Modular Training for RC	A. Continue validation of theat-oriented SM/ARTEPs.
		B. Determine time/costs to achieve proficiency.
		13. Determine allocation of tasks between institution/ unit.
		19. Evaluate rapid refresher training programs.
		25. Validate the effectiveness and efficiency of training devices.
M60A1	M60A1 Scaled Range Sub-Caliber Exercise	C. Determine time/costs to achieve proficiency.
		3. Determine allocation of tasks between institution/ unit.
		18. Determine effects of less capable trainees.
		20. Develop training concept to train with reduced resources.
		25. Validate the effectiveness and efficiency of training devices.

[1]Core objective (A-D) and situational variables (1-26) are defined in detail in Appendix 1 to Annex B.

SWT	Test Title	Core Objectives & Situational Variables
TOW	TOW TEA	A. Continue validation of threat-oriented SM/ARTEPs.
		3. Determine allocation of tasks between institution/unit.
		12. Determine exportable training packages to support training.
		18. Determine effects of less capable trainees.
		19. Evaluate rapid refresher training problems.
		25. Validate the effectiveness and efficiency of training devices.
USAFAS	FO/Unit Training	A. Continue validation of threat-oriented SM/ARTEPs.
		B. Determine time/costs to achieve proficiency as reflected by unit training schedules.
		C. Develop diagnostic tests to measure proficiency.
		16. Determine effects of stability/instability on proficiency.
		17. Determine effects of reduced officer/NCO fill.
USAFAS	OFT CTEA Expansion	B. Determine time/costs to achieve proficiency.
		C. Develop diagnostic test to measure proficiency and decay levels.

SWT	Test Title	Core Objectives & Situational Variables
		19. Evaluate rapid refresher training programs.
		25. Validate the effectiveness and efficiency of training devices.
USAFAS	Suitability of 13F Exported Training	B. Determine time/costs to achieve proficiency.
		C. Develop diagnostic tests to measure proficiency.
		3. Determine allocation of tasks between institution/unit.
		5. Determine impact of transfer of all or portions of AIT/BT to FORSCOM.
		12. Determine exportable training packages to support training.
CDEC	Training Instrumentation Evaluation (TIE Test)	A. Continue validation of threat-oriented SM/ARTEPs.
		B. Determine time/costs to achieve proficiency. Determine collective learning decay by comparing performance with train-up phase (Core Objective C).
		16. Determine effects of stability/instability.
		17. Determine effects of reduced officer/NCO fill.

SWT	Test Title	Core Objectives & Situational Variables
		25. Validate the effectiveness and efficiency of training devices.
USAFAS/ARI	Cannon Crew Turnover	C. Diagnostic tests to proficiency and decay levels.
		16. Determine effects of stability/instability.
USAFAS/ARI	Retention & Proficiency of Common AIT Skills	A. Continue validation of threat-oriented SM/ARTEPs.
		C. Determine diagnostic tests to measure proficiency and decay levels.
		3. Determine allocation of tasks between institution/unit.
	New Tests	
USARRMC/ARI	Tank Crew Stability Test	A. Validate threat-oriented critical SM/ARTEP tasks, conditions, and standards.
		B. Determine time/costs to proficiencies for critical individual/collective tasks.
		C. Develop diagnostic tests to measure individual/collective learning decay levels.

SWT	Test Title	Core Objectives & Situational Variables
		D. Determine frequency of training required.
		16. Determine effects of stability/instability.
		25. Validate effectiveness and efficiency of training devices.
CAC/ARI	CAMMS/CATTS Follow-on Test	A. Validate threat-oriented critical SM/ARTEP tasks, conditions and standards.
		B. Determine time/costs to proficiencies for critical individual/collective tasks.
		C. Develop diagnostic tests to measure individual/collective learning decay levels.
		D. Determine frequency of retraining required.
		16. Determine effects of stability/instability.
		17. Determine effect of reduced officer/NCO fill.
		19. Evaluate rapid refresher training.
		20. Develop training concepts to train with reduced resources.
		25. Validate effectiveness and efficiency of training devices.

SWT	Test Title	Core Objectives & Situational Variables
USARRMC/ ARI/OTEA	XM1 OT III	A. Validate threat-oriented critical SM/ARTEP tasks, conditions and standards.
		B. Determine time/costs to proficiency for critical individual collective tasks.
		C. Develop diagnostic tests to measure individual/ collective learning decay levels.
		D. Determine frequency of retraining required.
		13. Determine training packets to ensure supervisor competence.
		24. Develop training programs to assimilate new equip- ment.
TBD	Proficiency & Learning Decay	A. Validate threat-oriented critical SM/ARTEP tasks, conditions and standards.
		B. Determine time/costs to proficiency for critical individual/collective tasks.
		C. Develop diagnostic tests to measure individual/ collective learning decay levels.
		D. Determine frequency of retraining required.

SWT	Test Title	Core Objectives & Situational Variables
TBD	BTM Training/Battle Drill Training Program Test	A. Validate threat-oriented critical SM/ARTEP tasks, conditions and standards.
		B. Determine time/costs to proficiency for critical individual/collective tasks.
		C. Develop diagnostic tests to measure individual/collective learning decay levels.
		D. Determine frequency of retraining required.
		3. Detemine allocation of tasks between institution/unit.
		4. Validate selected critical tasks for service school development of how to train to combat proficiency at least cost in a unit.
		13. Determine training packages to ensure supervisor competence.
		15. Determine resources required to attain unit collective proficiency.
		16. Determine effects of stability/instability.
		17. Determine effects of reduced officer/NCO fill.

SWT	Test Title	Core Objectives & Situational Variables
		18. Determine effects of less capable personnel entering the training base and units.
		20. Develop training concepts to train with reduced resources.
		25. Validate effectiveness and efficiency of training devices.
63C/H	63C/H Follow-on Test	A. Continue validation of threat-oriented SM/ARTEPs
		B. Determine time/costs to achieve proficiency.
		C. Determine decay rates and frequency of required retraining.
		3. Determine allocation of tasks between institution/unit.
		12. Develop exportable job training packages required to support training.
		13. Develop training packages to ensure supervisor competence.

ARMY TRAINING STUDY
1977-1978

QUALITY LEVEL DESCRIPTIONS

QUALITY LEVEL	TEST RESULTS	SURVEY RESULTS	BATTALION TRAINING MODEL OUTPUT
(QL1)	Multiple valid tests and $\alpha \leq .05$	Unbiased questionnaire, controlled sample, valid analysis.	Relative trend correct, absolute value of data validated by field testing.
(QL2)	Valid test and $\alpha \leq .20$	Biased questionnaire, controlled sample, valid analysis.	Relative trend correct, absolute value of data consistent with professional judgment and/or survey data.
(QL3)	Data collected and trends indicated.	Unbiased questionnaire small sample, no analysis.	Relative trend correct, absolute value of data unvalidated.
(QL4)	Insights, not directly supported by data.	Biased questionnaire, small sample, no analysis.	Relative trend unvalidated.
(QL5)	Information of marginal validity. Included primarily because no better information exists. Use only with deliberate caution.		
(QL6)	Information judged to be of insufficient quality to include.		

SD 81-290 AG Ft Belvoir

END

DATE

FILMED

DEC.

1987